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VOLUME 1 OF 2

SITE WORK AND BUILDING CONSTRUCTION

CONSTRUCTION CONTRACT NO. 2
CENTRALIZED WASTE STORAGE
AND TRANSFER FACILITY
PRATT & WHITNEY
EAST HARTFORD, CT

Specification Book No. M-572

MAY 17, 1991

Prepared for:

UNITED TECHNOLOGIES CORPORATION
PRATT & WHITNEY
400 Main Street
East Hartford, Connecticut 06108

Prepared by:

LOUREIRO ENGINEERING ASSOCIATES
100 Northwest Drive
Plainville, Connecticut 06062
(203) 747-6181

Comm. No. 971-13

ADDENDUM NO. 1
FOR
CONSTRUCTION CONTRACT NO. 2
CENTRALIZED WASTE STORAGE
AND TRANSFER FACILITY
PRATT & WHITNEY
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ADDENDUM NO. 1 CONSISTS OF THE FOLLOWING:

A. Five text pages including this cover page.
B. One new sheet to be included with drawings:
   Sheet E-6 of Drawing No. FS-030507-E titled "Wiring Diagrams"
   and dated 5-17-91.
C. Two sketches showing changes to drawing sheets:
   No. S-4-1 and No. E-1-1

A. CHANGES TO SPECIFICATION BOOK NO. M-572

DIVISION 0 - BIDDING REQUIREMENTS, CONTRACT FORMS, AND CONDITIONS OF THE CONTRACT

Section 00851 - Drawings Index

On Page 00851-2 add under Electrical:
"E-6 Wiring Diagrams"

DIVISION 1 AND 2: No Changes

DIVISION 3 - CONCRETE

Section 03300 - Cast-In-Place Concrete

On Page 03300-4, add a Paragraph 2.01 P to read:
"P. Curing, sealing and dust proofing compound for mechanical and electrical room slabs shall be Cure 309 by Sonneburn Building Products, or equal, applied in accordance with manufacturers instructions".

DIVISION 4 TO 7: No Changes

DIVISION 8 - DOORS AND WINDOWS

Section 08700 - Finish Hardware

On Page 08700-5, change Paragraph 2.06 B to read:

"B. Parallel Closer: Russwin T2810 B-4 for the following doors: 1, 2, 3, 5, 6, 27, 29, 33, 32, 37, 44 and 28".

DIVISION 9 TO 14: No Changes

DIVISION 15 - MECHANICAL

Section 25600 - Heating and Ventilating

On Page 15600-4, change the third sub-paragraph of Paragraph 2.03 to read:

"Exhaust fans EF-3A, 3B, 4A and 4B, in Rooms 6 and 7, shall be Series 35 with fiberglass housing and resin coated propeller (EF-4A shall be provided with special lining for resistance to dilute hydrofluoric acid vapors). Shafts and other metal parts in contact with the air stream shall be Type 304 Stainless Steel (except EF-4A which shall be monel)".

A. CHANGES TO SPECIFICATION BOOK NO. M-572 (CONT'D)

DIVISION 16 - ELECTRICAL

Section 16400 - Electrical Work

On Page 16400-3 add a new Paragraph 1.09 to read:
"1.09 Temporary Power and Telephone

"Electrical Contractor shall furnish and install a 480 volt, 3 pole, 100 amp circuit breaker in an existing Square"D", I-line circuit breaker panelboard located in existing barrel storage building, north of construction site, and run 100 amp, 480 volt service to new temporary construction power distribution panel opposite north-west corner of construction site about 250 feet west of the barrel storage building. Service to consist of 3 #4 power conductors and 1 #8 grounding conductor. Service will require at least two (2) 40' poles and suitable cable support at eave of barrel storage building. Service wiring shall be messenger supported cable assembly, triplex, multi-conductor cable, classified as hard usage type, or open conductors on insulators. Mount power conductors 30 inches above telephone cable (by others) to provide minimum clearance below telephone cable of 18 feet.

"At the temporary power distribution panel Contractor shall provide and install a 5/8" dia. ground rod, 10' long, main fusible disconnect, 480V, 3 pole, 100 amp, A480V, 60A. fusible switch with 45 amp fuses, A 30 KVA transformer, 480-208Y/120 volt, and A 24-30 pole panelboard, 208Y/120Y, 3 phase-4 wire, with at least 8 GFI, 20 amp, 1 pole, circuit breakers for receptacles and 14, 20 amp, 1 pole circuit breakers for temporary lighting inside new CWS&T facility as required until permanent lights are installed and operating. All electrical equipment installed for temporary power shall be in NEMA 3R (raintight) enclosures.

"Electrical Contractor shall comply with requirements of Article 305 of NEC. "Contractor shall furnish and install any additional electrical equipment required for the construction phase of this job, including work under Contract 3.

"Contractor shall furnish all lighting fixtures required for temporary lighting inside CWS&T facility to maintain a level of approximately 15-20 foot candles at floor level. Room 1 and 2 will require the equivalent of 9, 2-lamp F96T12 VHO fluorescent fixtures; Room 6 & 7 will require the equivalent of 12 2-lamp F96T12 SHO fluorescent fixtures.

"After the completion of Contract 2, all temporary electrical facilities shall be removed by the Contractor as directed by P&W (United)".

B. CHANGES TO DRAWING NO. FS-030507-E

DRAWING TITLE SHEET

On the Index of Drawings, add under Electrical:
"E-6 Wiring Diagrams"

SHEET L-5 ELECTRICAL PLAN & MISC. DETAILS

On Electrical Plan Building E, Contractor shall extend security (alarmed doors) cable, 2C#18, through new 3/4" conduit from new junction box shown to an existing cable tray, mounted above the indicated east-west aisle, approximately 900' west and 400' south to security headquarters at Bldg. Column N-1. Terminate cable run as directed by P&W (United) for connection to security alarm system by others.

Contractor shall install a 2" conduit from new junction box shown to existing cable tray above east-west aisle for use by telephone company.

Note: Fire alarm cable shown routed with telephone cable to the CWS&T facility remains Contractor responsibility.

SHEET S-2 ROOF FRAMING PLAN

On the Roof Framing Plan, delete the joist shown 8'-6" east of column Line 10 between column Lines B and C, and delete note reading: "Extra joist where piping is concentrated".

On the Roof Framing Plan, add a framed roof opening for exhaust Fan 5 located immediately east of column Line 10 and north of column Line B2.

SHEET S-4 FOUNDATION DETAILS

Section 16/S4 shall be revised as shown on Sketch No. S-4-1 attached to this Addendum.

SHEETS E-1, E-2 AND E-4

Electrical conduits supported from the roof trusses and passing through the fire walls at column lines 5 and 5', shall be installed using flexible conduit as shown on Sketch No. E-1-1 attached to this Addendum.

B. CHANGES TO DRAWING NO. FS-030507-E (CONT'D)

SHEET E-1 POWER PLAN

On the Power Plan, change the power requirements for six louvers on the north wall. The three motorized louvers on the north wall of Room 1 and the three motorized louvers on the north wall of Room 6 each require two motors. Each motor shall be provided with a separate manual starter. Manual starters in Room 1 shall be explosion proof.

On the Power Plan, add start-stop push button stations and associated wiring for RF 1A and RF 1B similar to those shown for RF 2A and RF 2B.

On the Power Plan motor horsepower for EF 1A, 1B, 4A and 4B shall be 2 HP.

On the Power Plan run 3/4" conduit with 4#14 conductors from door operator DO of Door No. 23 to door Operator DO of Door No. 35 for interlocking.

On the Power Plan, power to AC unit shall be 2#12, 1#12 EG-3/4" C.

On the Power Plan add wiring between door operators, 8#14 3/4" C of Doors 45 and 46. Operate both doors from both sides.

SHEET E-3 ELECTRICAL DETAILS

On the Typical Interior HID Lighting Control, add "lights on" indicating lights in control room.

SHEET E-4 AUXILIARY SYSTEMS

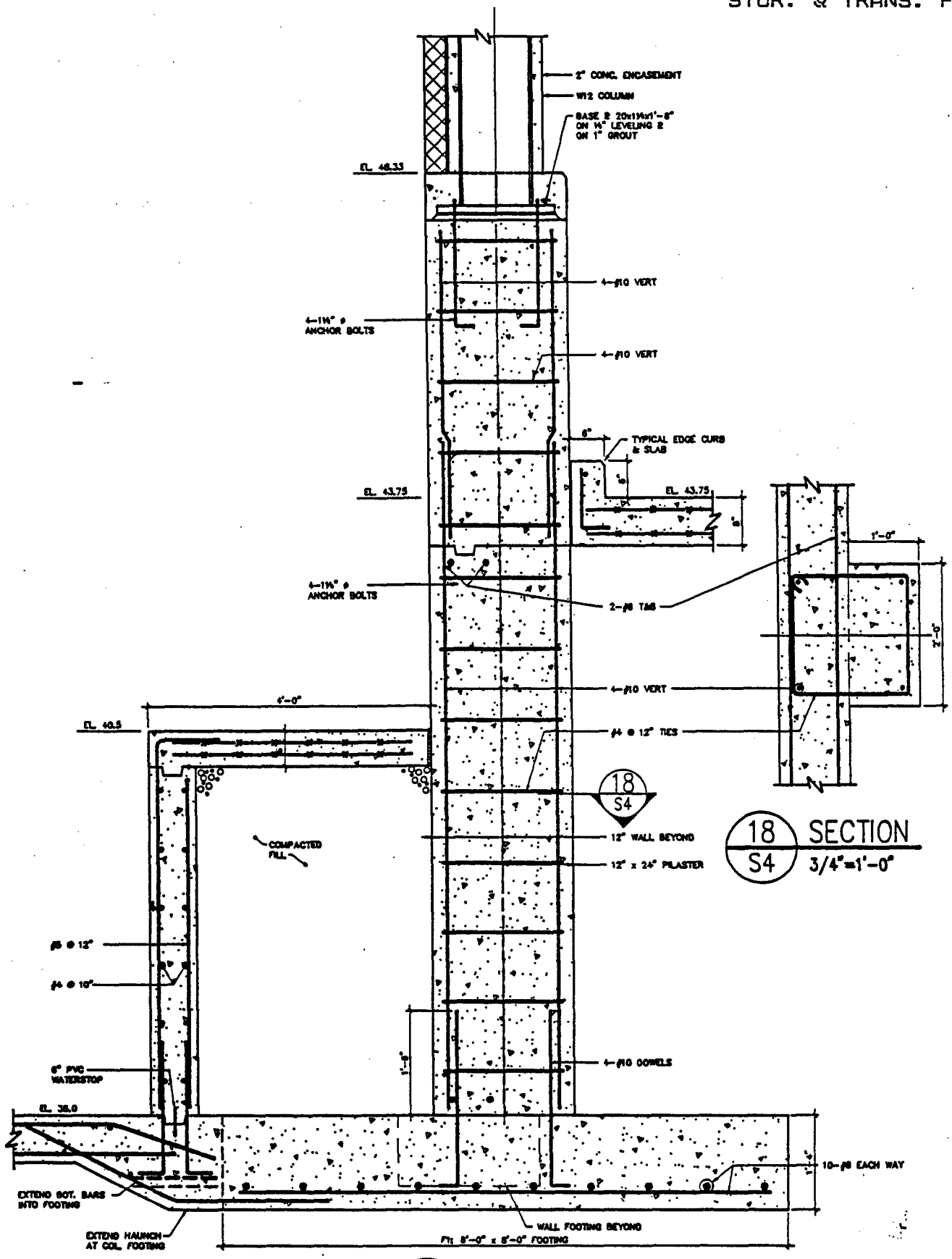
On the Smoke Detectors AH (Duct), add note reading:
"Wire SD1 and SD2 to one point in Kidde Panel. Ditto SD3 & SD4".

On the Handicapped Emergency Call-For-Aid change catalog numbers to:
Light - Simplex 4903-9151 w/plain lens.
Bell - Simplex 2901-9066 with 2975-9027 back box with 4905-9903 adapter plate.
Switch - Simplex 2764-9202.

SHEET E-6 WIRING DIAGRAMS

A new Sheet E-6 is attached to this Addendum.

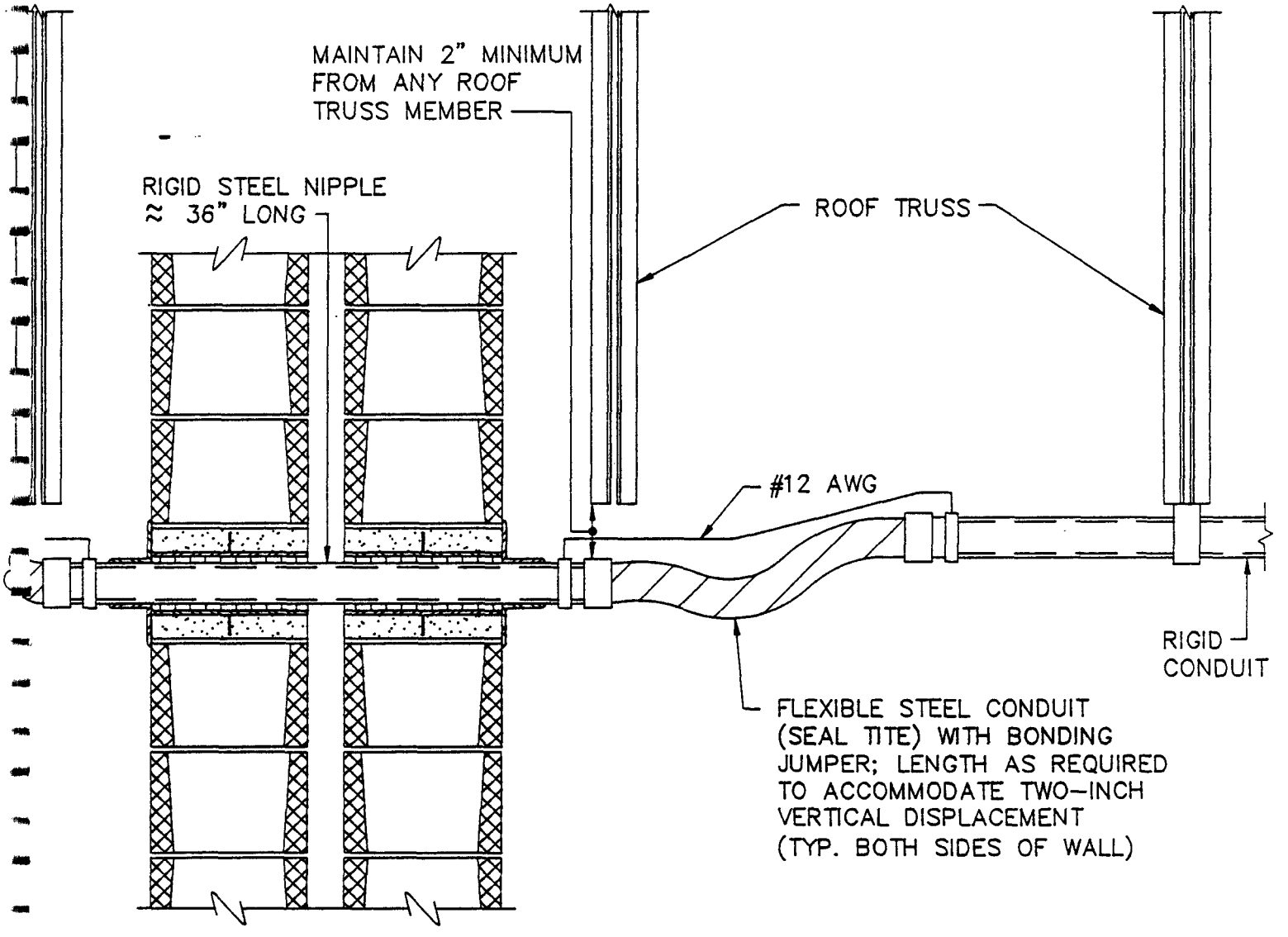
END OF ADDENDUM NO. 1
(See Attached Sketches and Drawing)



18/S4 SECTION
3/4"=1'-0"

16/S4 SECTION
½"=1'-0"

P&W EAST HARTFORD
CENTRALIZED WASTE
STOR. & TRANS. FAC.(2)



SEE SHEET M-2 FOR WALL
PENETRATION DETAIL

ELECTRICAL CONDUIT PASS THRU DETAIL AT FIRE WALL 5 – 5'

ADDENDUM NO. 1
SKETCH NO. E-1-1

WSFAIE11 (1)

UNITED TECHNOLOGIES PRATT&WHITNEY

400 Main Street
East Hartford, Connecticut 06108

July 18, 1991

Maranba Builders, Inc.
1010 Wethersfield Avenue
Hartford, Ct. 06114

Attention: Mr. Roger Barshan

Bulletin No. 1

Re: United Technologies Corporation, Pratt & Whitney Group, Operations Contract dated 6/24/91 for Construction of the Centralized Waste Storage and Transfer Facility, C-91045.

THIS IS A PROPOSAL

This Contractor shall furnish all material and labor required for the completion of the work described, including all items incidental thereto or necessary to complete the work even though not specifically mentioned.

W Specification M-572 for the original work will govern all work unless otherwise mentioned.

The Contractor is requested to submit within seven calendar days a detailed cost estimate of any proposed change to the Contract amount and/or completion time as a result of the work described herein.

PROPOSED CHANGE NO.	DESCRIPTION
1	Revised drawing Sheets S1 to S6 and new Sheet S7 are being issued for clarification of miscellaneous dimensions and details.

Requested by: William G. Winter

William G. Winter

cc: D. Moriarty

UNITED TECHNOLOGIES PRATT&WHITNEY

400 Main Street
East Hartford, Connecticut 06108

July 22, 1991

Maranba Builders, Inc.
1010 Wethersfield Avenue
Hartford, Ct. 06114

Attention: Mr. Roger Barshan

Bulletin No. 2

Re: United Technologies Corporation, Pratt & Whitney Group, Operations Contract dated 6/24/91 for Construction of the Centralized Waste Storage and Transfer Facility, C-91045.

THIS IS A PROPOSAL

This Contractor shall furnish all material and labor required for the completion of the work described, including all items incidental thereto or necessary to complete the work even though not specifically mentioned.

P&W Specification M-572 for the original work will govern all work unless otherwise mentioned.

The Contractor is requested to submit within seven calendar days a detailed cost estimate of any proposed change to the Contract amount and/or completion time as a result of the work described herein.

PROPOSED CHANGE NO.	DESCRIPTION
2	New Sheet S-8 issued for clarification of storage tank piers and pump pad locations within the 16 containment areas shown on Sheet S-1.

Requested by: William G. Winter

William G. Winter

cc: D. Moriarty

UNITED TECHNOLOGIES PRATT&WHITNEY

400 Main Street
East Hartford, Connecticut 06108

August 13, 1991

Maranba Builders, Inc.
1010 Wethersfield Avenue
Hartford, Ct. 06114

Attention: Mr. Roger Barshan

Bulletin No. 3

Re: United Technologies Corporation, Pratt & Whitney Group, Operations Contract dated 6/24/91 for Construction of the Centralized Waste Storage and Transfer Facility, C-91045.

THIS IS A PROPOSAL

This Contractor shall furnish all material and labor required for the completion of the work described, including all items incidental thereto or necessary to complete the work even though not specifically mentioned.

P&W Specification M-572 for the original work will govern all work unless otherwise mentioned.

The Contractor is requested to submit within seven calendar days a detailed cost estimate of any proposed change to the Contract amount and/or completion time as a result of the work described herein.

PROPOSED CHANGE NO.	DESCRIPTION
3	In Section 15600, para. 2.09A, delete the connection to the fire alarm system from the low temperature stat. This contact shall be provided for connection to the alarm annunciator under Contract 3.
4	On Sheets L-4 and L-5, add 45 deg. fittings on the utility connections to the building for non-potable water, fire protection and compressed air.
5	On Sheets A-1, A-7 and S-1 change Door No. 26 to a double door of one 3'-0" X 9'-0" leaf and one 1'-4" X 9'-0" leaf. The new masonry opening is 4'-8".

PROPOSED CHANGE NO.	DESCRIPTION
6	On Sheets A-1 and S-1 move the following 2'-0" to the west: Door No. 20 Transporter unloading station located north of Tank No. 6
7	On Sheet A-6, delete one dovetail slot from each column face which is currently shown with two slots. Add dovetails slots at 24" o.c. to the exterior face of the concrete walls on Lines 1, A and 11 which extend up to Elev. 48.33.
8	On Sheet S-1, the sump shown near column A2-1 shall be 2' wide, 2' deep and 15'-6" long. Details will be provided later.
9	On Sheet S-1, change the centerline-to-centerline dimension of the future mezzanine columns from 10'-9" to 10'-8".
10	On Sheet S-2, where Lintels L-1, L-2 and L-5 bear on masonry walls, grout the masonry solid for two courses below the lintel for a length of 2'-0". Provide two 1/2" X 12" anchor bolts.
11	On Sheet S-4, add #4@12" bent bars to the containment walls north of Tanks 6, 10 and 14, doweling the wall to the slab at El.43.75. Dowels to extend 1'-6" into both slab and wall.
12	On Sheet M-3, delete smoke detectors on supply ductwork from air handlers AH-1, AH-2, AH-3 and AH-4.
13	On Sheet E-4, delete smoke detectors at air handlers AH-1, AH-2, AH-3 and AH-4. Add smoke detectors to the exhaust ductwork to exhaust fan EF-1A, EF-1B, EF-2A, EF-2B, EF-3A, EF-3B, EF-4A and EF-4B (see locations on sheets M-3 and M-4). Revise conduits and wiring accordingly.
14	On Sheet E-5, One-Line Diagram, provide for interruption of power by freeze stat for AH-1, AH-2, AH-3 and AH-4.

Requested by: William G. Winter

William G. Winter

cc: D. Moriarty

00005
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END OF SECTION

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PROJECT TITLE: CENTRALIZED WASTE STORAGE & TRANSFER FACILITY

DRAWING NO.: FS-030507-E

CONTRACT NO.: 2

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END OF SECTION

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01010 - SUMMARY OF THE WORK

1. GENERAL

1.01 CONTRACT NO. 2

The Contractor shall perform all work as shown on drawings and as specified herein. These documents cover Contract No. 2, which is part of a group of four construction contracts as described in paragraph 1.02. The primary goal of Contract No. 2 is to construct a storage building ready for occupancy and use of the container storage areas in the north half of the building and use of the support facilities and truck pads and forklift ramp in the south part of the building.

1.02 RELATED CONTRACTS

The overall program for development of the Centralized Waste Storage and Transfer Facility consists of a demolition contract (removal of the Casablanca Building and the Oil House) and four construction contracts as follows:

Contract No. 1 - Early Site Prep
(Relocation of piping and utilities to facilitate new construction)

Contract No. 2 - Building Construction
(as described in paragraph 1.01)

Contract No. 3 - Process Systems
(Tanks, pumps, piping, controls and related systems for storage of liquid wastes in the south half of the new building and for transfer of these wastes to vendors or to the existing Concentrated Waste Treatment Plant; a separate contract will be awarded during construction of Contract No. 2).

Contract No. 4 - Truck Scale
(New truck scale east of the new building with interconnections to the new building for obtaining truck weights. A separate contract will be awarded during construction of Contract No. 2).

1.03 COORDINATION WITH CONTRACT 3 REQUIREMENTS

The work under Contract 2 shall be coordinated with the requirements of Contract 3, particularly with regard to the installation of mechanical and electrical systems. The following shall govern the work under Contract 2:

A. Maintain maximum clearance above truck pads and above future tanks to insure capability for tank removal. Where this is not feasible, provide flanges or similar connections to facilitate dismantling of ducts or piping.

B. Where so designated on drawings, allow space for routing of pipes, ducts and other facilities to be installed under Contract 3.

2. REMOVALS AND RESTORATIONS

2.01 Removals and restorations by the Contractor under Contract No. 2 shall include, but not be limited to :

A. Pavement removal and restoration.
B. Storm drain removal and replacement.
C. Sanitary drain and miscellaneous pipe removal.
D. The Contractor shall restore all areas disturbed by the construction activities as shown on the contract drawings and as specified herein.

2.02 Removals and relocations by United will include:

A. Temporary and permanent fencing
B. Traffic guard rails

3. NEW WORK

New work by the Contractor under Contract No. 2 shall include, but not be limited to the following:

A. Site work including earthwork, utility services and paving.
B. Structural steel framing.
C. Concrete foundations, slabs and tank containments.
D. Concrete masonry walls.
E. Single membrane roof.
F. Doors, windows and other architectural features.
G. Mechanical work including plumbing, fire protection, HVAC and services as required to facilitate process installations under Contract No. 3.
H. Electrical work including power distribution, lighting, alarms, security, communications, and services as required to facilitate process installations under Contract Nos. 3 and 4.

END OF SECTION

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01300 - SUBMITTALS

1. GENERAL

1.0 INCLUSIONS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification sections, apply to work specified in this section.

1.02 SCOPE

The Contractor shall submit to United, prior to commencing work, a complete listing of manufacturer's names for equipment and material he proposes to furnish for the job.

A. After review and return by United of the list of manufacturers' names for equipment and material, and prior to delivery of any material to job site, and sufficiently in advance of required delivery date to allow engineering time for checking, Contractor shall submit to United eight (8) copies of detailed dimensioned drawings of all equipment showing construction, size, arrangement, performance characteristics, operating clearances, capacity of equipment, electrical characteristics, and accessories as specified or shown on drawings. All equipment unless otherwise specified shall be a standard catalogued product of an established manufacturer, of equal quality, durability and finish to that specified. United may also request drawings for approval of any items to be constructed or fabricated by Contractor.

B. Drawings, catalogs, samples, specifications, etc., submitted for review shall be clearly labeled indicating equipment, number (per schedule on drawings), specific service or use, job names, Contractor's name, and Manufacturer's name and address. Items for which review is being requested shall be specific, and identification in catalog, pamphlet or drawings shall be clearly made in ink. Data of a general nature, or incomplete in any respect will not be accepted.

C. Following approval of shop drawings, no further changes will be considered without written application from Contractor, and

will not be allowed without written consent or approval of United. Approval of shop drawings does not apply to quantities, nor relieve Contractor of his responsibility of necessity of furnishing material, or performing work required by Contract Drawings and Specifications. Approval of shop drawings shall not be considered a guarantee of measurements or of building conditions.

D. Unless otherwise specified, not less than eight (8) copies of all Contractor's and Subcontractor's drawings shall be submitted to United for review. United will retain six (6) copies of and return two (2) copies to the Contractor and/or Subcontractor.

E. All Contractor's drawings submitted for approval shall be sent directly to United. All drawings submitted by Subcontractors under the Contractor for approval by United, shall first be sent by the Subcontractors direct to the Contractor who shall keep a record of the drawing numbers and date of receipt.

F. The Contractor shall check thoroughly all Subcontractor's drawings regarding measurements, sizes of members, materials and details to satisfy himself that they conform to the intent of United's plans and specifications. Drawings found to be inaccurate or otherwise in error shall be returned to the Subcontractor(s) for correction before submitting them to United. After the Contractor has checked and approved such drawings, he shall place thereon the date of approval and signature of the checker and then submit them to United for review.

G. All Contractor's and Subcontractor's drawings shall be submitted in the order in which materials are needed at the site without necessarily waiting for completion of all drawings before submitting part of them for approval.

H. The Engineer's or Owner's approving or reviewing of the Contractor's and Subcontractors' drawings does not relieve the Contractor from responsibility for errors or omissions which may exist, even though work is done in accordance with such approved or reviewed drawings. Approval or review of Contractor's and Subcontractors' drawings by United is a gratuitous assistance and United does not thereby assume responsibility for errors or omissions. Where such errors or omissions are discovered later, they shall be made good by the Contractor irrespective of any review by United.

END OF SECTION

DIVISION 2 - SITEWORK

SECTION 02045 - REMOVALS AND RESTORATIONS

1. GENERAL

1.01 INCLUSIONS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification sections, apply to work specified in this section.

1.02 SCOPE

A. Work of this section includes all labor, materials, and equipment to perform removals and restorations.

B. Removals shall include:

- Pavement
- Storm and sanitary drains
- Other facilities as shown on drawings or as required to construct new work.

C. Restorations shall include:

- Pavement
- Storm drains

D. Removal and restoration of temporary and permanent fencing will be by United.

1.03 QUALITY ASSURANCE

A. Removals and restorations shall be conducted in a manner to minimize interruption of normal Pratt & Whitney activities.

B. The Contractor shall give a minimum of one week notice in writing before interruption of any utility services.

C. All of these services are necessary to the operation of the existing facilities which must remain in operation during construction. No interruption shall be made until approved by United.

1.04 SUBMITTALS

A. The Contractor shall submit a schedule of expected utility interruptions in writing.

B. The Contractor shall submit a letter certifying that all wastes have been properly disposed of.

1.05 JOB CONDITIONS

A. The Contractor shall exercise strict dust control measures to minimize potential adverse effects on operations by United. Debris shall be placed in approved containers to prevent the spread and accumulation of dust and dirt. Debris shall be removed as often as necessary to prevent nuisance conditions. Operations likely to produce dust shall be conducted with proper precautions to minimize dust. If, for any reason, unacceptable dust conditions are caused by the Contractor, the offending operation(s) shall immediately be terminated, corrective action immediately instituted and notification immediately given to United.

B. All OSHA regulations shall be complied with.

2. EXECUTION

2.01 GENERAL REQUIREMENTS

A. Removals shall be performed without damage to adjacent retained work; however, where such work is damaged, the Contractor shall patch, repair or otherwise restore same to its original condition. All existing materials, fixtures, and equipment which have been removed or disconnected, but are not indicated or specified for reuse in the new work or to be turned over to United shall become the property of the Contractor and shall be removed from the site by the Contractor at his expense. Disposal of such materials off-site shall be in accordance with Section 23 of the General Conditions, except that, if any soil or other material removed is found to require handling and disposal as a hazardous waste, such material shall be placed in containers furnished by United; disposal of such material will be by United. No material removed shall be placed in the clean spoil stockpile on-site unless specifically authorized by United nor shall any pavement, concrete, pipe or other rubble be mixed with soils to be placed in the clean spoil stockpile. Removals shall be as indicated and as specified herein, and shall be performed in a neat and workmanlike manner to the limits indicated or specified, or to the minimum extent necessary or required for the proper installation of new work. Existing surfaces remaining after removals to which new work is to be applied shall be left in a condition suitable for the application of the new work.

B. Restorations and relocations shall include all work necessary to restore facilities to a condition equal to that existing before start of the work. Restorations shall be performed by workmen skilled in the trade involved in a neat, workmanlike manner and shall be in accordance with appropriate sections of the specifications.

2.02 DEFINITION OF WORK

A. Bituminous pavement shall be removed within the limits indicated on drawings and elsewhere as required for performance of the work. Existing pavement shall be neatly cut at the edge of the area to be removed. Pavement shall be ground up to a size consistent with reuse as a base material and shall be mixed with and stockpiled with existing pavement base for reuse as directed by United. Pavement shall be replaced as specified in Section 02513.

B. Existing drains shall be removed if located within the foundation line of the new structure; removal of drains shall extend to 10 feet outside the foundation line. Drain removal shall include removal of the pipe, manholes and catch basin(s). Ends of storm drains to remain shall be plugged even if the remaining section of line is inactive. Plugs shall consist of brick or block with non-shrink grout. Connections of new lines to existing facilities shall be made neatly with minimum damage to existing. New and restored drains shall be as shown on drawings and as specified in Section 02713.

C. Removal of sanitary drains shall include existing inactive vitrified clay pipe and manhole.

D. Removal of other miscellaneous pipes and electrical lines shall be carried out to the extent shown on drawings. All lines will be deactivated and cleaned/flushed by United before removal by Contractor.

END OF SECTION

DIVISION 2 - SITEWORK

SECTION 02220 - EARTHWORK

1. GENERAL

1.01 INCLUSIONS

The General Conditions, Contract Drawings, the terms and conditions of the Contract Agreement, and applicable portions of Division 1 are a part of this section.

1.02 SCOPE

Provide all labor, materials, equipment and services for the work of this Section as shown on the drawings and/or as specified herein. The work shall include, but not be limited to the following:

a. Pavement removal as necessary.

b. Excavation and backfill for structures and pipe lines.

c. Sand bedding for pipe lines.

d. Rough and finish grading and pavement sub base preparation.

e. Sheeting, shoring and bracing requirements.

f. Pumping water from excavations.

g. Erosion control.

1.03 RELATED WORK SPECIFIED ELSEWHERE

a. Bituminous Paving; in Section 02513.

b. Buried Piping & Utilities; in Section 02713.

1.04 JOB CONDITIONS

The Contractor shall exercise strict dust control measures to minimize potential adverse effects on operations by United. Debris shall be placed in approved containers to prevent the spread and accumulation of dust and dirt. Debris shall be removed as often as necessary to prevent nuisance conditions. Operations likely to produce dust shall be conducted with proper precautions to minimize dust. If, for any reason,

unacceptable dust conditions are caused by the Contractor, the offending operation(s) shall immediately be terminated, corrective action immediately instituted and notification immediately given to United.

1.05 DATA GIVEN

Drawings show data or existing conditions based on best information available, and Engineer or United will not be responsible for accuracy of data submitted. Submission of a proposal by the Contractor binds him to accept the site as it actually is, and perform work as shown on Drawings or specified herein.

1.06 ENGINEERING & LAYOUT

The locations of foundations and pipe lines are shown on the Contract Drawings. The Contractor shall utilize the services of a competent surveyor to determine all lines and elevations necessary for the location and construction of the work under this contract. The surveyor shall carefully compare all levels given on the drawings with those recorded in the field and shall call to the attention of United any discrepancies before proceeding with the work. Work shall be carried out in accordance with the requirements of report attached to this Section: "Geotechnical Feasibility Study" by Clarence Welti, P.E., P.C.

1.07 PROTECTION OF EXISTING UTILITIES

Contractor shall assume full responsibility for damage to any existing utility lines during the course of work and be liable for damages as a result thereof. The Contractor shall notify the Owner of all existing utilities in the vicinity of the construction.

1.08 SAFETY PRECAUTIONS

Work shall be done in conformance with all applicable OSHA regulations, including temporary barricades, railings, lighting, etc., marking and protecting open excavations.

1.09 EXCAVATION CLASSIFICATION

Excavation shall be "unclassified" and shall include the removal of all earth, boulders, and materials of whatever description as necessary for completion of the work.

1.10 SOIL TESTING

A. The Contractor shall engage the services of an independent testing laboratory to provide the following basic services:

1. Classification of excavated site materials and suitability for reuse as fill.

2. Examine and approve off-site material when required for additional fill.

3. Perform laboratory tests on gravel fill samples provided by contractor when required.

4. Perform on-site soil density tests for required compaction when required.

B. The Contractor will be reimbursed for the actual cost of testing services plus markups as provided for in the Fixed Price Proposal.

2. PRODUCTS

2.01 FILL AND BACKFILL MATERIALS

A. All excavated material which is free of organic materials and foreign substances shall be utilized whenever fill material is required for backfilling of trenches around structures. Such usable material shall be stockpiled where indicated on drawings. Material unsuitable for backfill or surplus to the work shall be removed from the site as directed by the Owner.

B. Bankrun gravel supplied by Contractor shall be used as specified herein. Material shall be new, clean, bankrun gravel free from elongated pieces within the following gradation requirements:

SQUARE OPENING SIEVE SIZE	2-½"	¼"	No. 40	No. 100
PERCENT FINER BY WEIGHT	100	30-65	5-30	0-10

Fraction of dry sample passing No. 100 mesh sieve shall not have sufficient plasticity to perform plastic limit test ASTM D-424.

C. Sand shall be clean and shall have properties that will permit compaction to a modified Proctor Density of 95 percent. It shall have a grading within the following, per ASTM 33:

SQUARE OPENING SIEVE SIZE	3/8"	No. 4	No. 8	No. 16	No. 30
PERCENT FINER PASSING BY WEIGHT	100	95-100	80-100	50-85	25-60

SQUARE OPENING SIEVE SIZE	No. 50	No. 100
PERCENT FINER PASSING BY WEIGHT	10-30	2-10

NOTE: 3% pass. No. 200 maximum by wash test.

D. Crushed stone shall be within the following gradation requirements:

SQUARE OPENING SIEVE SIZE	1"	3/4"	3/8"	No. 4
PERCENT FINER PASSING BY WEIGHT	100	90-100	0-20	0-5

E. Quality Control: When directed to, material to be used as backfill and fill shall be submitted to an independent testing laboratory, under contract to Owner, for Modified Proctor Density Test ASTM D1557-64T.

F. Fill and backfill materials shall be subject to approval by the Owner.

3. EXECUTION

3.01 SOIL AND GROUNDWATER SAMPLING

A. During excavation work the Contractor shall provide assistance to United to facilitate collection of soil and groundwater samples from excavated areas. Such assistance shall consist of labor and equipment to provide access for sampling. Labor and equipment for actual sample collection will be by United. The sampling procedures may require brief interruptions in the work.

B. The samples will be used to determine whether or not removed soil and debris requires special disposal methods. If special disposal is required, the material shall be handled as described in Section 02045 Paragraph 2.01 of these specifications.

3.02 EXCAVATION FOR STRUCTURE FOUNDATIONS

A. Strip surface materials and properly dispose of unwanted materials such as broken paving, boulders, and other unusable excavated materials off-site in accordance with all applicable laws and regulations.

B. Excavate to depths and lineal dimensions required to permit subsequent formwork, concrete operations, and other work to proceed without hindrance. Excavations for structures shall be carried down to firm, undisturbed moraine or bedrock. Excavations etc., must be sufficiently wide to compact all fill by mechanical means. In general, excavation shall be cut to line 18" outside of the face of footings with no undercutting permitted.

C. Surfaces of excavations shall be carefully dressed to grades noted to receive subsequent construction. Bottoms shall be substantially level, with no large projections, and free of loose material. Material at bottoms of excavations shall be undisturbed.

D. Excavations for footings shall be carried down to footing lines and grades with final trimming done by hand so that foundations rest on undisturbed earth. Where organic matter or unsuitable foreign material is encountered in excavating for footings, such material shall be removed and space occupied by it shall be refilled to grade with compacted, bank-run gravel. Such gravel used for this purpose will not be paid for as extra work.

E. Side slopes of excavation shall be less than angle of repose of material excavated and shall be flat enough to prevent slides or cave-ins. Any excavation required as a result of slides or cave-ins shall be done by Contractor at his own expense.

F. If bottom of any excavation has been removed below grade shown by Drawings or that prescribed, it shall be brought to grade at Contractor's expense by refilling with bank run gravel well compacted, and subject to Owner's approval.

G. Excavations for foundations shall be compacted before placing concrete.

3.03 EXCAVATION FOR PIPELINES

A. Trenches shall be of sufficient width and depth at all points to allow all pipes to be laid, joints to be formed, and appurtenance constructions to be built in most thorough and workmanlike manner and to allow for sheeting, shoring, pumping and draining when required. Trenches shall be 18 inches wider than outside dimensions of pipe line or utilities they are to contain; trenches for pipes must not be unnecessarily wide so as to materially increase load on pipe resulting from backfill. Bottoms of trenches shall be carried to lines and grades as shown on the Drawings. No tunneling will be permitted in place of open trench construction unless especially authorized by Owner. Trenches for pipe lines shall be excavated to a grade six inches below the bottom of the final elevation of the pipe unless the Owner authorizes laying pipelines directly on native material.

B. Trenches shall be opened at such times and to such extent only as may be permitted by Owner. Excavated material may be used for embankments, backfill and fill in the manner specified herein.

C. Side slopes of excavation shall be less than angle of repose of material excavated and shall be flat enough to prevent slides or cave-ins. Any excavation required as a result of slides or cave-ins shall be done by Contractor at his own expense.

D. If bottom of any excavation has been removed below grade shown by Contract Drawings or that prescribed by Owner, it shall be

brought to grade at Contractor's expense by refilling with excavated material well compacted or crushed stone and subject to Owner's approval.

3.04 SHEETING, SHORING AND BRACING

Contractor shall furnish, install in place, and maintain such sheeting, shoring and bracing shall be taken to guard against any damage to or settlement of buildings, walls, utilities, roads, or other structures which are adjacent to work. Sheeting installed next to existing structures shall be left in place; unless specifically noted otherwise, use either steel sheeting piling or pressure-treated (creosote) timber sheet piling. Cut off tops as required and leave in place.

3.05 PUMPING OF WATER

Contractor shall remove by pumping, draining, bailing or otherwise, any water which may accumulate or be found in excavations made under this contract. Contractor shall dispose of all water from excavations in a manner that will not cause injury to health, Owner's property, work completed or in progress, surface of roadways, nor cause any interference with use of roadways by Owner.

3.06 PLACING AND COMPACTING BACKFILL FOR STRUCTURES AND OTHER AREAS

A. Place and compact bank run gravel, backfill and fill material in all areas as required by Drawings and excavation work. Allow for subsequent construction in the placing and compacting of backfill.

B. Material used for fill and backfill within structures shall be bank-run gravel as specified. Crushed stone shall be used for any backfill deposited below water.

C. Material used for fill and backfill beyond limits of structures and pipes, and below pavement base shall be excavated earth, free from topsoil, organic material, and foreign substances, unless otherwise directed and approved by Owner.

D. Any material needed for fill or backfill beyond limits of structures in excess of suitable excavated earth,used for rough grading and regrading shall be classified as borrow. material shall be generally granular material from a single source and free from foreign and organic substances, loam, lumps of clay, silt in excess of 10%, and cobbles in excess of 6-inch diameter. Material shall be subject to Owner's approval.

E. No backfill shall be placed against foundation walls, until Owner's permission is obtained.

F. Deposit all fill and backfill in 6-inch layers adequately compacting each layer to specified density using approved methods. In places close to walls, footing, utility lines, etc., where larger equipment cannot properly be permitted to operate, hand tamping equipment, equivalent to Barco Rammers weighing at least 150 pounds, shall be used. Crushed stone deposited below water level may be placed in one lift to 6" above water level, compacted, and covered with Mirafi filter fabric in 8" lifts, compacting to 95% Modified Proctor Density.

G. Materials shall contain moisture content to achieve required compaction but no free water (puddling) shall be allowed during compaction. No material shall be placed at a moisture content in excess of the optimum content as achieved in ASTM D1557-64T. Density of each layer of fill and backfill shall be at least 95% Modified Proctor Density.

H. Field density tests shall be performed by an independent testing laboratory, under contract to Owner, when and where required in field by Owner to insure compaction specified for fill and backfill is obtained. If field density tests indicate compaction to be less than the specified herein, the Contractor shall improve compaction by a method as approved by Owner until further tests indicate a density of at least that as specified herein. Additional field tests necessary because of failure of first tests to comply with density requirements listed herein shall be made by laboratory at Contractor's expense.

3.07 BEDDING AND BACKFILL FOR PIPING

A. All piping shall be laid in sand bedding. The trench, excavated as specified in 3.2 above, shall receive 6" of sand below the piping and 12" above the piping.

B. The pipe to be installed must be laid in a dry trench. If the construction is below the water table, the Contractor must operate and maintain a dewatering system until the trench in that area has been completely backfilled.

C. Backfilling shall be done with care to avoid damage to the pipelines under construction. Backfill material to 12" above the stone shall be sand as specified or shall be sand from excavated material or from other sources when directed by Owner. Select backfill shall be free from organic material and frozen pieces, and no stones with any dimension greater than one-half inch will be permitted. Such backfill shall be hand placed in layers of three (3) inches to the top of the pipe, and each layer compacted to a Modified Proctor Density of at least 95 percent with a mechanical tamper. Layers must be laid and compacted uniformly on each side of pipe. Water shall be added

as needed to provide for adequate compaction, but water flooding will not be permitted. Mechanical tamping equipment shall be operated in such a manner that it does not make contact with the pipe but compaction shall be accomplished to within one-inch of the pipe on each layer. Compaction of the one foot of backfill immediately above the pipe shall be accomplished in a similar fashion except that backfill material shall be applied in two six-inch lifts.

D. The balance of the backfill may be completed with mechanical equipment. The backfill in trenches shall be placed in layers not more than 6" thick and shall be compacted to 95% Modified Proctor Density by tamping or other approved means. Materials used for backfill shall be subject to the inspection and approval of Owner and if the excavated material is unsuitable for backfill, the Contractor shall dispose of the unsuitable material and substitute approved bankrun gravel, or other material in the amounts and proportions specified by Owner.

3.08 FILL AND BACKFILL BEYOND LIMITS OF STRUCTURES AND PAVEMENTS

A. Excavated on-site earth shall be used for all fill and backfill beyond limits of structures and shall be placed in 6-inch layers before compaction. Backfill and fill shall be thoroughly compacted using power rollers or other motorized vehicular equipment.

B. Before any paving material is placed, sub-grade shall be shaped to line and grade and suitably compacted. All unsuitable material shall be removed and hollows and depressions shall be filled and compacted to the level necessary to receive the base course as specified in Section 02513.

3.09 FINISH GRADING

All areas indicated as being regraded on Drawings are to be finished to grades shown. Other areas disturbed by work of this contract are to be regraded to blend with existing surfaces. All finish grading shall be done to achieve suitable surface drainage and run-off.

4.0 EROSION CONTROL

All catch basins in the vicinity of the construction site which are downgradient of the proposed work shall be protected with sediment barriers as shown on the drawings.

5.0 EXISTING SUBSURFACE CONDITIONS

A. Bids shall be based on the assumption that material to be excavated is principally silt, sand and gravel fill.

B. The groundwater elevation and location measured is shown on the drawings.

C. Soil data is included in boring logs attached to this section.

END OF SECTION

See attached Welti Report of January 3, 1991
(5 pages) and boring logs (16 pages).

DR. CLARENCE WELTI, P.E., P.C.

GEOTECHNICAL ENGINEERING

227 Williams Street • P.O. Box 397
Glastonbury, CT 06033

(203) 633-4623 / FAX (203) 657-2514

January 3, 1991

Pratt & Whitney
400 Main Street
East Hartford, CT. 06108

Att: David Montany; Plant Engineering
Mail Stop 102-15

Re: Hazardous Waste Storage Facilty; East Hartford, CT.
Geotechnical Feasiblity Study

Dear Mr. Montany:

1.0 Herewith are boring data pertaining to the above. Two borings, made in the general area of the site for a prior ground water study, appear to provide representative data for this geotechnical study. These borings, WT-MW6 and WT-MW7 were drilled to the top of the Silt-Clay at 30 to 40 feet below grade. Sampling with split spoons provides blow counts to permit evaluation of seismic requirements at the proposed facility.

2.0 Geology of Site: The subject site and environs are part of the ancient glacial lake, covering most of the Connecticut River valley during the glacial eras.

2.1 Soil Cross Section: Locally there is up to 10 feet of loose Fine to Coarse Sand FILL, overlying the natural soils; which consist generally of Medium to Coarse Sands to 30 to 35 feet below grade; overlying the varved Silt and Clay, which extends to a depth of about 150 feet below grade.

2.11 Water Table: The water table is at Elev. 28 to Elev.30 and it is generally controlled by the proximity to Willow Pond at about Elev. 27 to 28. The pond is part of Willow Brook.

3.0 Topography of Site in Building Area: The area is quite flat with less than 4 feet of relief. It is covered by pavement or existing (to be razed) buildings.

4.0 Project Description: The proposed structure will cover an area of about 80,000 sf with a single floor. The building is proposed for Hazardous Waste Storage.

5.0 Foundation Analysis: In assessing foundation types and loading the following criteria are applied:

a. Review of the soils cross section for possible zones of unsuitable materials - i.e. Fills, organics, etc. to define type of foundation, depth of foundation, possible special foundation preparation and loading for foundation

b. Study of possible liquefaction of soils below water level for seismic requirements

c. Review of loading, columns and floors, to define settlements due to deep seated consolidation

d. Define settlements of materials immediately below footings to establish loading on soils and to correctly define type of foundation to fit structural requirements

e. Establish construction procedures for proposed foundation to ascertain feasiblity of system from both a practical and economic standpoint

5.1 There is evidence of filling at boring MW-7 to as deep as 10 feet. The FILL is a Fine to Coarse Sand. This material could be excavated and replaced with proper controls to achieve comparable bearing characteristics to the natural soils. Apart from the localized fills, there are no deleterious materials from a foundation standpoint (note: no evaluation was made of any chemical contamination of the soils in this report).

5.2 Regarding the question of liquefaction of the soils, the soils are generally medium of coarse sands, which are locally loose, but are generally medium compact. There appears to be minimal risk of liquefaction of such soils. The underlying silt-clay is quite cohesive and the development of liquefaction in such soils requires considerably more time than the length of even a severe earthquake. The possiblity of liquefaction appears to be quite low and should not influence the selection of foundation types. The "S" factor should be 1.5, based on the somewhat loose character of the soils.

5.3 There is a deep clay stratum, as cited above, which will consolidate under floor loadings exceeding 500 psf. The column loads with a one story structure will be

generally insignificant at the depth of clay (30 to 40 feet). For a floor loading of 1500 psf over the entire building would result in clay consolidation of 1.5 to 2.5 inches. There would also be minor consolidation of the sands atop the clays. If the loading is in excess of 2000 psf the increase in settlement would be at a considerably steeper rate. This is due to the fact that the clays have been geologically preconsolidated to about 1 Ton/sf.

5.4 Regarding the settlement of individual column footings, it is presumed that a typical column load would be 100 to 150 kips with a loading of 1.5 Tons/sf (3000 psf). The soils below the footings have typically a stiffness modulus of about 500 ksf. This is based on numerous pressure meter tests by the writer. Based on the above, the approximate subsidence of columns would be less than 1/2".

5.5 The contruction procedures with a spread footing system would be similar to that at most structures (except in the areas of fills). There would be no extraordinary requirements. This type of foundation is typical of foundations over the entire Pratt & Whitney facility.

6.0 Design Parameters:

6.1.Fill placement should include compaction of existing fills to at least a depth of 0.7 x the footing width below footings to a density of at least 95% of modified optimum density (ASTM- 1557-D). Natural soils at footing level should be compacted, surficially, to at least 93% of modified optimum density.

6.2 Allowable soil pressures are 1.5 Tons/sf at columns and 1.0 Tons/sf at wall footings.

6.3 Lateral pressures on any depressed areas should be equivalent to a liquid of 55 pcf density.

7.0 Preparation for the slab shall include compaction of all fill to a depth of at least 4 feet and all backfill to at least 95% of modified optimum density. The backfill and fill could be on site excavated materials (unless excluded by reason of chemical contamination). Additional materials should conform to the following gradation:

Percent Passing	Sieve Size
100	3.5"
50 - 100	3/4"
25 - 100	No.4

The fraction, passing the No.4 sieve, should have less than 15%, passing the No. 200 sieve.

7.1 The top 6" of material beneath the slab should be processed stone base, conforming to CONNDOT 814, section M.05.01. It should be compacted to 98% of modified optimum density.

7.2 The subgrade modulus with the above criteria will be at least 400 pci.

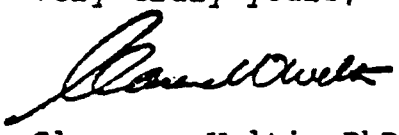
8.0 Regarding future settlements the loading must be reviewed to correctly predict and accomodate such settlements. In general, if loading is less than 1500 psf at the floor the amount of settlement and the differential settlement between columns do not appear to be excessive for the structure. Such settlements would approximate about 2" at the center of the building, about 1.3" at the middle of the long sides and about 1" at the corners for a loading at the floor of 1500 psf.

10.0 This report has been prepared for specific application to the subject project in accordance with genarally accepted soil and foundation engineering practices. No other warranty, expressed or implied, is made. In the event that any changes in the nature, design and location of structues are planned, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing.

The analyses and recommendations submitted in this report are based in part upon data obtained from referenced explorations. The extent of variation betwen the explorations may not become evident until construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations of this report.

Clarence Welti, P.E.,P.C. should perform a general review of the final design and specifications in order that geotechnical design recommendations may be properly interpreted and implemented as they were intended.

Very truly yours,



Clarence Welti, PhD, P.E.
President, Dr. Clarence Welti, P.E.,P.C.

CW:nl
Encs.

CLARENCE WELTI ASSOC., INC. P.O BOX 397 GLASTONBURY, CONN 06033	CLIENT PRATT & WHITNEY	PROJECT NAME F&O PROJ.NO.90-531 LOCATION EAST HARTFORD, CT

DRILLING PROCEDURES. 1 1., 2., 3., 4. (Select one or more)

1. HOLLOW STEM AUGER. Diameter 3.75"
2. DRIVEN CASING. Diameter
3. DRILLED CASING. Diameter
4. ROCK CORING. Diameter & type

HOLE NO. WT-81 Surface Elevation

GROUND WATER OBSERVATIONS
AT 11.0' FT AFTER HOURS
AT FT AFTER HOURS

START DATE 11/19/90
FINISH DATE 11/19/90

DEPTH	SAMPLE NO	SAMPLE BLOWS/6"	SAMPLE DEPTH	A	STRATUM DESCRIPTION + DEPTH	REMARKS
	1	4-3-3-2	0.5'-2.5'		**0.3'	
	2	3-3-5	2.5'-4.0'		***0.7'	
	3	8-8-8-10	4.0'-6.0'		BR.FINE-CRS.SAND	
5	4	9-9-6-8	6.0'-8.0'			
	5	6-6-7-7	8.0'-10.0'			
10	6	6-5-5-5	10.0'-12.0'		10.5'	
					****12.0'	
					BOTTOM OF BORING 12.0'	
15					**ASPHALT	
					***BLK.FINE-MED.SAND	
					****BR.MED-CRS.SAND, SOME FINE GRAVEL	
25						
30						
35						
40						

LEGEND: Col A

140lb Wt. x 30" fall on 2" O.D Sampler

Sample Type	Proportions Used	Cohesionless Density	Cohesive Consistency
D = Dry C = Cored W = Washed	trace 0 to 10%	0-10 Loose	0-4 Soft
UP = Undisturbed Piston	little 10 to 20%	10-30 Med.Dense	4-8 M/Stiff
TP = Test Pit A = Auger V = Vane Test	some 20 to 35%	30-50 Dense	8-15 Stiff
UT = Undisturbed Thinwall	and 35 to 50%	50 + Very Dense	15-30 V-Stiff

Driller URSIN
Helper
Inspector
Sheet 1 of 1

1 Unless otherwise agreed, ***samples*** will be held by Welti Associates a maximum of 60 days after boring completion.
2 ***Water readings*** represent driller observations — not interpretations.

CLARENCE WELTI ASSOC., INC. P O BOX 397 GLASTONBURY, CONN 06033	CLIENT PRATT & WHITNEY	PROJECT NAME E&O PROJ NO 90-531 LOCATION EAST HARTFORD, CT

DRILLING PROCEDURES. 1 (1, 2, 3, 4 (Select one or more))

1 HOLLOW STEM AUGER. Diameter 3.75"
2. DRIVEN CASING. Diameter
3. DRILLED CASING. Diameter
4 ROCK CORING. Diameter & type

HOLE NO. WT-82 | Surface Elevation

GROUND WATER OBSERVATIONS
AT 10.01 FT AFTER 0 HOURS
AT FT AFTER HOURS

START DATE 11/19/90
FINISH DATE 11/19/90

DEPTH	SAMPLE NO	SAMPLE BLOWS/6"	SAMPLE DEPTH	A	STRATUM DESCRIPTION + DEPTH	REMARKS
	1	9-6-5-3	0.5'-2.5'		** 0.2'	
	2	3-2-1	2.5'-4.0'		*** 0.3'	
	3	3-3-4-6	4.0'-6.0'		DRK/BR.FINE-CRS.SAND,SOME SILT	
5					5.0'	
	4	6-6-6-6	6.0'-8.0'			
					BR.FINE-CRS.SAND	
	5	5-7-8-6	8.0'-10.0'			
10	6	6-5-8-9	10.0'-12.0'		10.0'	
					BR.FINE-CRS.SAND,LITTLE FINE GRAVEL	
					12.0'	
					BOTTOM OF BORING 12.0'	
15					**ASPHALT	
					***TRAPROCK	
20						
25						
30						
35						
40						

LEGEND: Col A

Sample Type
D = Dry C = Cored W = Washed
UP = Undisturbed Piston
TP = Test Pit A = Auger V = Vane Test
UT = Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density	Cohesive Consistency
0-10 Loose	0-4 Soft
10-30 Med.Dense	4-8 M/Stiff
30-50 Dense	8-15 Stiff
50 + Very Dense	15-30 V-Stiff

Driller URSIN
Helper
Inspector
Sheet 1 of 1

1 Unless otherwise agreed, *samples* will be held by Welti Associates a maximum of 60 days after boring completion.
2 *Water readings* represent driller observations — not interpretations.

CLARENCE WELTI ASSOC., INC.
P O BOX 397
GLASTONBURY, CONN 06033

CLIENT
PRATT & WHITNEY

PROJECT NAME
F&O PROJ.NO.90-531

LOCATION
EAST HARTFORD, CT

DRILLING PROCEDURES. 1 (1, 2, 3, 4. (Select one or more)

1. HOLLOW STEM AUGER. Diameter 3.75"
2. DRIVEN CASING. Diameter
3. DRILLED CASING. Diameter
4. ROCK CORING. Diameter & type

HOLE NO. B-3 | Surface Elevation

GROUND WATER OBSERVATIONS
AT 8.5' FT AFTER 0 HOURS
AT FT AFTER HOURS

START DATE 11/26/90
FINISH DATE 11/26/90

DEPTH	SAMPLE NO	SAMPLE BLOWS/6"	SAMPLE DEPTH	A	STRATUM DESCRIPTION + DEPTH	REMARKS
	1	10-14-6-4	0.5'-2.5'		** 0.3'	
	2	5-5-5	2.5'-4.0'		*** 0.5'	
					**** 2.5'	
	3	8-5-5-5	4.0'-6.0'			
5						
	4	7-6-6-5	6.0'-8.0'		BR.FINE-CRS.SAND,LITTLE FINE GRAVEL	
	5	7-6-5-5	8.0'-10.0'			
10					10.0'	
					BOTTOM OF BORING 10.0'	
					**ASPHALT	
15					***TRAPROCK	
					****BR.FINE SAND,SOME SILT	
20						
25						
30						
35						
40						

LEGEND: Col A

140lb Wt. x 30" fall on 2" O.D Sampler

Sample Type	Proportions Used	Cohesionless Density	Cohesive Consistency
D = Dry C = Cored W = Washed	trace 0 to 10%	0-10 Loose	0-4 Soft
UP = Undisturbed Piston	little 10 to 20%	10-30 Med.Dense	4-8 M/Stiff
TP = Test Pit A = Auger V = Vane Test	some 20 to 35%	30-50 Dense	8-15 Stiff
UT = Undisturbed Thinwall	and 35 to 50%	50 + Very Dense	15-30 V-Stiff

Driller URSIN
Helper
Inspector
Sheet 1 of 1

1 Unless otherwise agreed, *samples* will be held by Welti Associates a maximum of 60 days after boring completion.
2 *Water readings* represent driller observations — not interpretations.

CLARENCE WELTI ASSOC., INC.
P O BOX 397
GLASTONBURY, CONN 06033

CLIENT
PRATT & WHITNEY

PROJECT NAME
F&O PROJ.NO.90-531

LOCATION
EAST HARTFORD, CT

DRILLING PROCEDURES 1 1., 2., 3., 4. (Select one or more)

1. HOLLOW STEM AUGER. Diameter 3.75"
2. DRIVEN CASING. Diameter
3. DRILLED CASING. Diameter
4. ROCK CORING. Diameter & type

HOLE NO. B-4 | Surface Elevation

GROUND WATER OBSERVATIONS
AT 9.5' FT AFTER 0 HOURS
AT FT AFTER HOURS

START DATE 11/19/90
FINISH DATE 11/19/90

DEPTH	SAMPLE NO	BLOWS/6"	DEPTH	A	STRATUM DESCRIPTION + DEPTH	REMARKS
	1	9-7-4-3	0.5'-2.5'		** 0.3'	
	2	1-2-1-3	2.5'-4.5'		*** 1.0'	
	3	5-4-4-5	4.5'-6.5'		BR.FINE-CRS.SAND	
5					4.5'	
	4	4-4-5-5	6.5'-8.5'			
	5	5-7-6-6	8.5'-10.5'		BR.FINE-CRS.SAND, TR.FINE GRAVEL	
10					10.5'	
					BOTTOM OF BORING 10.5'	
					**ASPHALT	
15					***TRAPROCK	
20						
25						
30						
35						
40						

LEGEND: Col A

Sample Type
D = Dry C = Cored W = Washed
UP = Undisturbed Piston
TP = Test Pit A = Auger V = Vane Test
UT = Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density	Cohesive Consistency
0-10 Loose	0-4 Soft
10-30 Med.Dense	4-8 M/Stiff
30-50 Dense	8-15 Stiff
50 + Very Dense	15-30 V-Stiff

Driller URSIN
Helper
Inspector
Sheet 1 of 1

1 Unless otherwise agreed, *samples* will be held by Welti Associates a maximum of 60 days after boring completion
2 *Water readings* represent driller observations — not interpretations.

CLARENCE WELTI ASSOC., INC. P O BOX 397 GLASTONBURY, CONN 06033	CLIENT PRATT & WHITNEY	PROJECT NAME F&O PROJ.NO.90-531 LOCATION EAST HARTFORD, CT

DRILLING PROCEDURES 1 (1, 2, 3, 4 (Select one or more))

1 HOLLOW STEM AUGER. Diameter 3.75"
2. DRIVEN CASING. Diameter
3 DRILLED CASING. Diameter
4 ROCK CORING. Diameter & type

HOLE NO. B-5 | Surface Elevation

GROUND WATER OBSERVATIONS
AT 8.0' FT AFTER 0 HOURS
AT FT AFTER HOURS

START DATE 11/19/90
FINISH DATE 11/19/90

DEPTH	SAMPLE NO	SAMPLE BLOWS/6"	SAMPLE DEPTH	A	STRATUM DESCRIPTION + DEPTH	REMARKS
	1	4-3-3-2	0.5'-2.5'		** 0.2'	
	2	2-3-3	2.5'-4.0'		*** 0.5'	
					**** 2.0'	
	3	4-3-5-5	4.0'-6.0'		***** 4.0'	
5					BR.FINE-MED.SAND	
	4	5-5-6-6	6.0'-8.0'		5.5'	
	5	4-7-7-8	8.0'-10.0'		BR.FINE-CRS.SAND,LITTLE FINE GRAVEL	
10					10.0'	
					BOTTOM OF BORING 10.0'	
					**ASPHALT	
15					***TRAPROCK	
					****ORK/BR.FINE-MED.SAND	
					*****BR.FINE SAND,SOME SILT	
20						
25						
30						
35						
40						

LEGEND: Col A

Sample Type
D = Dry C = Cored W = Washed
UP = Undisturbed Piston
TP = Test Pit A = Auger V = Vane Test
UT = Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

Cohesionless Density
0-10 Loose
10-30 Med.Dense
30-50 Dense
50 + VeryDense

Cohesive Consistency
0-4 Soft
4-8 M/Stiff
8-15 Stiff
15-30 V-Stiff

140lb Wt. x 30" fall on 2" O.D Sampler

Driller URSIN
Helper
Inspector
Sheet 1 of 1

1 Unless otherwise agreed, *samples* will be held by Welti Associates a maximum of 60 days after boring completion
2 *Water readings* represent driller observations — not interpretations.

CLARENCE WELTI ASSOC., INC. P O BOX 397 GLASTONBURY, CONN 06033	CLIENT PRATT & WHITNEY	PROJECT NAME E&O PROJ.NO.90-531 LOCATION EAST HARTFORD, CT

DRILLING PROCEDURES. 1 (Select one or more)

1. HOLLOW STEM AUGER. Diameter 3.75"
2. DRIVEN CASING. Diameter
3. DRILLED CASING. Diameter
4. ROCK CORING. Diameter & type

HOLE NO. ~~UT W16~~ Surface Elevation

GROUND WATER OBSERVATIONS
AT 9.0' FT AFTER 0 HOURS
AT ____ FT AFTER ____ HOURS

START DATE 11/21/90
FINISH DATE 11/21/90

DEPTH	SAMPLE NO	SAMPLE BLOWS/6"	SAMPLE DEPTH	A	STRATUM DESCRIPTION + DEPTH	REMARKS
	1	5-3-1-2	0.5'-2.5'		** 0.4'	
	2	2-3-2-3	2.5'-4.5'		BR.FINE SAND	
	3	3-3-3-5	4.5'-6.5'		4.0'	
5						
	4	7-4 5-6	6.5'-8.5'			
	5	6-4-5-5	8.5'-10.5'			
10						
15	6	4-5-6-8	15.0'-17.0'		BR.FINE-CRS.SAND	
20	7	3-4-7-5	20.0'-22.0'			
25	8	4-5-8-9	25.0'-27.0'			
	9	5-8-9-12	27.0'-29.0'			
	10	3-4-6-9	29.0'-31.0'			
30						
	11	6-5-10-10	31.0'-33.0'		32.0'	
					*** 33.0'	
35					BOTTOM OF BORING 33.0'	
					**ASPHALT	
					***GR.SILT & CLAY,LITTLE FINE SAND	
					BACKFILLED HOLE WITH BENTONITE PELLETS & SAND FROM 32.0'-18.0'	
40						

LEGEND: Col A

Sample Type
D = Dry C = Cored W = Washed
UP = Undisturbed Piston
TP = Test Pit A = Auger V = Vane Test
UT = Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140lb Wt. x 30" fall on 2" O.D Sampler

Cohesionless Density	Cohesive Consistency
0-10 Loose	0-4 Soft
10-30 Med.Dense	4-8 M/Stiff
30-50 Dense	8-15 Stiff
50 + Very Dense	15-30 V-Stiff

Driller URSIN
Helper
Inspector
Sheet 1 of 1

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CLARENCE WELTI ASSOC., INC. P O BOX 397 GLASTONBURY, CONN 06033	CLIENT PRATT & WHITNEY	PROJECT NAME F&O PROJ.NO.90-531 LOCATION EAST HARTFORD, CT

DRILLING PROCEDURES 1 (Select one or more)

1 HOLLOW STEM AUGER. Diameter 3.75"
2 DRIVEN CASING. Diameter
3 DRILLED CASING. Diameter
4 ROCK CORING. Diameter & type

HOLE NO. B-7 | Surface Elevation

GROUND WATER OBSERVATIONS
AT 11.0' FT AFTER 0 HOURS
AT FT AFTER HOURS

START DATE 11/19/90
FINISH DATE 11/19/90

DEPTH	SAMPLE NO	BLOWS/6"	DEPTH	A	STRATUM DESCRIPTION + DEPTH	REMARKS
	1	6-4-4-2	0.5'-2.5'		** 0.3'	
	2	3-2-2	2.5'-4.0'		BR.FINE-CRS.SAND	
					2.5'	
	3	4-5-6-7	4.0'-6.0'		*** 2.7'	
5					BR.FINE-CRS.SAND	
	4	6-6-7-7	6.0'-8.0'		6.0'	
	5	7-9-8-9	8.0'-10.0'		BR.MED-CRS.SAND,SOME FINE GRAVEL	
10	6	7-5-7-9	10.0'-12.0'		12.0'	
					BOTTOM OF BORING 12.0'	
15					**ASPHALT	
					***BLK.COAL FRAGS.,LITTLE FINE GRAVEL	
20						
25						
30						
35						
40						

LEGEND: Col A

Sample Type
D = Dry C = Cored W = Washed
UP = Undisturbed Piston
TP = Test Pit A = Auger V = Vane Test
UT = Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density
0-10 Loose
10-30 Med.Dense
30-50 Dense
50 + VeryDense

Cohesive Consistency
0-4 Soft
4-8 M/Stiff
8-15 Stiff
15-30 V-Stiff

Driller URSIN
Helper
Inspector
Sheet 1 of 1

1 Unless otherwise agreed, *samples* will be held by Welti Associates a maximum of 60 days after boring completion
2 *Water readings* represent driller observations — not interpretations

CLARENCE WELTI ASSOC., INC. P O BOX 397 GLASTONBURY CONN 06033	CLIENT PRATT & WHITNEY	PROJECT NAME F&O PROJ.NO.90-531 LOCATION EAST HARTFORD, CT

DRILLING PROCEDURES 1 (1, 2, 3, 4 (Select one or more))

1 HOLLOW STEM AUGER Diameter 3.75"
2 DRIVEN CASING. Diameter
3 DRILLED CASING. Diameter
4 ROCK CORING. Diameter & type

HOLE NO. WT-MW7 Surface Elevation

GROUND WATER OBSERVATIONS
AT 10.0' FT AFTER 0 HOURS
AT FT AFTER HOURS

START DATE 11/29/90
FINISH DATE 11/29/90

DEPTH	SAMPLE NO	SAMPLE BLOWS/6"	SAMPLE DEPTH	A	STRATUM DESCRIPTION + DEPTH	REMARKS
	1	4-4-5-3	0.5'-2.5'		** 0.2'	
	2	8-8-8-6	2.5'-4.5'		*** 0.8'	
	3	1-2-1-2	4.5'-6.5'			
5						
	4	1-2-1-1	6.5'-8.5'		BR.FINE-CRS.SAND,FILL	
	5	2-2-2-3	8.5'-10.5'			
10					10.0'	
15	6	6-5-5-4	15.0'-17.0'			
20	7	3-3-4-6	20.0'-22.0'			
					BR.MED-CRS.SAND,SOME	
25	8	4-7-8-9	25.0'-27.0'		FINE GRAVEL	
30	9	3-4-3-7	30.0'-32.0'		31.0'	
					**** 32.0'	
					BOTTOM OF BORING 32.0'	
35					**ASPHALT	
					***TRAPROCK & BLK.FINE-MED.SAND,FILL	
					****GR.SILTY SAND,LITTLE CLAY	
					BACKFILLED AUGER HOLE WITH SAND &	
40					BENTONITE CHIPS FROM 30.0'-20.0'	

LEGEND: Col A

Sample Type	Proportions Used	Cohesionless Density	Cohesive Consistency
D = Dry C = Cored W = Washed	trace 0 to 10%	0-10 Loose	0-4 Soft
UP = Undisturbed Piston	little 10 to 20%	10-30 Med.Dense	4-8 M/Stiff
TP = Test Pit A = Auger V = Vane Test	some 20 to 35%	30-50 Dense	8-15 Stiff
UT = Undisturbed Thinwall	and 35 to 50%	50 + Very Dense	15-30 V-Stiff

140lb Wt. x 30" fall on 2" O.D Sampler

Driller URSIN
Helper
Inspector
Sheet 1 of 1

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CLARENCE WELTI ASSOC., INC.
P O BOX 397
GLASTONBURY, CONN 06033

CLIENT
PRATT & WHITNEY

PROJECT NAME
F&O PROJ.NO.90-531

LOCATION
EAST HARTFORD, CT

DRILLING PROCEDURES 1 (1 2 3 4 (Select one or more)

1 HOLLOW STEM AUGER. Diameter 3.75"
2 DRIVEN CASING. Diameter
3 DRILLED CASING Diameter
4 ROCK CORING. Diameter & type

HOLE NO. B-8 Surface Elevation

GROUND WATER OBSERVATIONS
AT 8.0' FT AFTER 0 HOURS
AT FT AFTER HOURS

START DATE 11/26/90
FINISH DATE 11/26/90

DEPTH	SAMPLE NO	SAMPLE BLOWS/6"	SAMPLE DEPTH	A	STRATUM DESCRIPTION + DEPTH	REMARKS
	1	7-5-4-3	1.0'-3.0'		**0.3'	
					***1.0'	
	2	4-4-3-4	3.0'-5.0'		BR.FINE SAND,LITTLE SILT	
					3.5'	
5	3	3-5-6-7	5.0'-7.0'			
	4	5-5-5-5	7.0'-9.0'		BR.FINE-CRS.SAND	
					9.0'	
10					BOTTOM OF BORING 9.0'	
					**ASPHALT	
15					***TRAPROCK	
20						
25						
30						
35						
40						

LEGEND: Col A

Sample Type
D = Dry C = Cored W = Washed
UP = Undisturbed Piston
TP = Test Pit A = Auger V = Vane Test
UT = Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140lb Wt. x 30" fall on 2" O.D Sampler

Cohesionless Density	Cohesive Consistency
0-10 Loose	0-4 Soft
10-30 Med Dense	4-8 M/Stiff
30-50 Dense	8-15 Stiff
50 + Very Dense	15-30 V-Stiff

Driller URSIN
Helper
Inspector
Sheet 1 of 1

1 Unless otherwise agreed, ***samples*** will be held by Welti Associates a maximum of 60 days after boring completion
2 ***Water readings*** represent driller observations — not interpretations

CLARENCE WELTI ASSOC., INC. P O BOX 397 GLASTONBURY CONN 06033	CLIENT PRATT & WHITNEY	PROJECT NAME F&O PROJ.NO.90-531 LOCATION EAST HARTFORD, CT

DRILLING PROCEDURES 1 (1, 2, 3, 4 (Select one or more))

1 HOLLOW STEM AUGER. Diameter 3.75"
2 DRIVEN CASING. Diameter
3 DRILLED CASING Diameter
4 ROCK CORING. Diameter & type

HOLE NO. B-9 | Surface Elevation

GROUND WATER OBSERVATIONS
AT 10.0' FT AFTER 0 HOURS
AT FT AFTER HOURS

START DATE 11/26/90
FINISH DATE 11/26/90

DEPTH	SAMPLE NO	SAMPLE BLOWS/6"	SAMPLE DEPTH	A	STRATUM DESCRIPTION + DEPTH	REMARKS
	1	7-8-8-5	1.0'-3.0'		** 0.2'	
					*** 0.7'	
	2	3-4-3-4	3.0'-5.0'		**** 3.0'	
5	3	4-4-5-6	5.0'-7.0'		BR.FINE-MED.SAND	
	4	4-7-7-9	7.0'-9.0'		7.0'	
	5	9-15-10-17	9.0'-11.0'		BR.MED-CRS.SAND,SOME FINE GRAVEL	
10					11.0'	
					BOTTOM OF BORING 11.0'	
15					**ASPHALT	
					***TRAPROCK	
					****ORK/BR.FINE-MED.SAND	
20						
25						
30						
35						
40						

LEGEND: Col A

140lb Wt. x 30" fall on 2" O.D Sampler

Sample Type	Proportions Used	Cohesionless Density	Cohesive Consistency
D = Dry C = Cored W = Washed	trace 0 to 10%	0-10 Loose	0-4 Soft
UP = Undisturbed Piston	little 10 to 20%	10-30 Med.Dense	4-8 M/Stiff
TP = Test Pit A = Auger V = Vane Test	some 20 to 35%	30-50 Dense	8-15 Stiff
UT = Undisturbed Thinwall	and 35 to 50%	50 + Very Dense	15-30 V-Stiff

Driller URSIN
Helper
Inspector
Sheet 1 of 1

1 Unless otherwise agreed, *samples* will be held by Welti Associates a maximum of 60 days after boring completion
2 *Water readings* represent driller observations — not interpretations

CLARENCE WELTI ASSOC., INC. P O BOX 397 GLASTONBURY CONN 06033	CLIENT PRATT & WHITNEY	PROJECT NAME F&O PROJ.NO.90-531 LOCATION EAST HARTFORD, CT

DRILLING PROCEDURES 1 (1, 2, 3, 4 (Select one or more))

1 HOLLOW STEM AUGER Diameter 3.75"
2 DRIVEN CASING. Diameter
3 DRILLED CASING. Diameter
4 ROCK CORING. Diameter & type

HOLE NO. B-10 | Surface Elevation

GROUND WATER OBSERVATIONS
AT 11.0' FT AFTER 0 HOURS
AT FT AFTER HOURS

START DATE 11/26/90
FINISH DATE 11/26/90

DEPTH	SAMPLE NO	SAMPLE BLOWS/6"	SAMPLE DEPTH	A	STRATUM DESCRIPTION + DEPTH	REMARKS
	1	8-7-6-4	1.0'-3.0'		** 0.3'	
					*** 1.0'	
	2	5-3-4-4	3.0'-5.0'			
5	3	4-3-2-2	5.0'-7.0'		BR.FINE-CRS.SAND	
	4	3-5-5-6	7.0'-9.0'			
	5	4-5-5-7	9.0'-11.0'			
10						
	6	4-6-6-7	11.0'-13.0'		11.0'	
					BR.MED-CRS.SAND & FINE GRAVEL	
					13.0'	
15					BOTTOM OF BORING 13.0'	
					**ASPHALT	
					***TRAPROCK	
20						
25						
30						
35						
40						

LEGEND: Col A

140lb Wt x 30" fall on 2" O.D Sampler

Sample Type	Proportions Used	Cohesionless Density	Cohesive Consistency
D = Dry C = Cored W = Washed	trace 0 to 10%	0-10 Loose	0-4 Soft
UP = Undisturbed Piston	little 10 to 20%	10-30 Med Dense	4-8 M/Stiff
TP = Test Pit A = Auger V = Vane Test	some 20 to 35%	30-50 Dense	8-15 Stiff
UT = Undisturbed Thinwall	and 35 to 50%	50 + Very Dense	15-30 V-Stiff

Driller URSIN
Helper
Inspector
Sheet 1 of 1

1 Unless otherwise agreed, *samples* will be held by Welti Associates a maximum of 60 days after boring completion
2 *Water readings* represent driller observations — not interpretations

CLARENCE WELTI ASSOC., INC. P O BOX 397 GLASTONBURY, CONN 06033	CLIENT PRATT & WHITNEY	PROJECT NAME F&O PROJ.NO.90-531 LOCATION EAST HARTFORD, CT

DRILLING PROCEDURES 1 (1, 2, 3, 4 (Select one or more)

1 HOLLOW STEM AUGER Diameter 3.75"
2 DRIVEN CASING. Diameter
3 DRILLED CASING. Diameter
4 ROCK CORING. Diameter & type

HOLE NO. B-11 Surface Elevation

GROUND WATER OBSERVATIONS
AT 11.5' FT AFTER 0 HOURS
AT FT AFTER HOURS

START DATE 11/27/90
FINISH DATE 11/27/90

DEPTH	SAMPLE NO	BLOWS/6"	DEPTH	A	STRATUM DESCRIPTION + DEPTH	REMARKS
	1	3-3-3-4	1.0'-3.0'		** 0.3'	
					*** 0.5'	
	2	2-2-3-4	3.0'-5.0'		**** 1.5'	
	3	3-3-4-5	5.0'-7.0'			
					BR.FINE-CRS.SAND	
	4	3-3-3-4	7.0'-9.0'			
	5	4-4-6-6	9.0'-11.0'			
10					11.0'	
	6	4-5-4-4	11.0'-13.0'		BR.FINE-CRS.SAND,SOME FINE GRAVEL	
					13.0'	
					BOTTOM OF BORING 13.0'	
15						
					**ASPHALT	
					***TRAPROCK	
20						
					****DRK/BR.& BLK.FINE-MED.SAND	
25						
30						
35						
40						

LEGEND: Col A

Sample Type
D = Dry C = Cored W = Washed
P = Undisturbed Piston
T = Test Pit A = Auger V = Vane Test
UT = Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140lb Wt. x 30" fall on 2" O.D Sampler

Cohesionless Density	Cohesive Consistency
0-10 Loose	0-4 Soft
10-30 Med Dense	4-8 M/Stiff
30-50 Dense	8-15 Stiff
50 + Very Dense	15-30 V-Stiff

Driller URSIN
Helper
Inspector
Sheet 1 of 1

1. Unless otherwise agreed *samples* will be held by Welti Associates a maximum of 60 days after boring completion
2. *Water readings* represent driller observations – not interpretations

CLARENCE WELTI ASSOC., INC. P O BOX 397 GLASTONBURY, CONN 06033	CLIENT PRATT & WHITNEY	PROJECT NAME F&O PROJ.NO.90-531 LOCATION EAST HARTFORD, CT

DRILLING PROCEDURES 1 (1. 2. 3. 4 (Select one or more))

1 HOLLOW STEM AUGER. Diameter 3.75"
2 DRIVEN CASING. Diameter
3 DRILLED CASING. Diameter
4 ROCK CORING. Diameter & type

HOLE NO. B-12 | Surface Elevation

GROUND WATER OBSERVATIONS
AT 10.0' FT AFTER 0 HOURS
AT ____ FT AFTER ____ HOURS

START DATE 11/27/90
FINISH DATE 11/27/90

DEPTH	SAMPLE NO	BLOWS/6"	DEPTH	A	STRATUM DESCRIPTION + DEPTH	REMARKS
	1	2-2-4-5	1.0'-3.0'		** 0.3'	
					*** 0.5'	
	2	4-3-3-4	3.0'-5.0'		**** 1.2'	
					***** 4.0'	
5	3	4-5-5-6	5.0'-7.0'			
	4	4-5-6-6	7.0'-9.0'			
					BR.FINE-CRS.SAND,	
	5	3-3-3-3	9.0'-11.0'		LITTLE FINE GRAVEL	
10					11.0'	
					BOTTOM OF BORING 11.0'	
					**ASPHALT	
15					***TRAPROCK	
					****BLK.FINE-MED.SAND,	
20					SOME BLK.SILT	
					*****BR.FINE-MED.SAND	
25						
30						
35						
40						

LEGEND: Col A

140lb Wt. x 30" fall on 2" O.D Sampler

Sample Type	Proportions Used	Cohesionless Density	Cohesive Consistency
D = Dry C = Cored W = Washed	trace 0 to 10%	0-10 Loose	0-4 Soft
UP = Undisturbed Piston	little 10 to 20%	10-30 Med.Dense	4-8 M/Stiff
TP = Test Pit A = Auger V = Vane Test	some 20 to 35%	30-50 Dense	8-15 Stiff
UT = Undisturbed Thinwall	and 35 to 50%	50 + VeryDense	15-30 V-Stiff

Driller URSIN
Helper
Inspector
Sheet 1 of 1

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2 *Water readings* represent driller observations — not interpretations

CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY CONN 06033	CLIENT PRATT & WHITNEY	PROJECT NAME F&O PROJ.NO.90-531 LOCATION EAST HARTFORD, CT

DRILLING PROCEDURES. 1 (1, 2, 3, 4 (Select one or more))

1 HOLLOW STEM AUGER Diameter 3.75"
2 DRIVEN CASING. Diameter
3 DRILLED CASING Diameter
4 ROCK CORING.. Diameter & type

HOLE NO. B-13 | Surface Elevation

GROUND WATER OBSERVATIONS
AT 9.5' FT AFTER 0 HOURS
AT FT AFTER HOURS

START DATE 11/19/90
FINISH DATE 11/19/90

DEPTH	SAMPLE NO	SAMPLE BLOWS/6"	SAMPLE DEPTH	A	STRATUM DESCRIPTION + DEPTH	REMARKS
	1	8-5-3-2	0.5'-2.5'		** 0.2'	
	2	2-1-1	2.5'-4.0'		*** 0.5'	
	3	2-4-4-5	4.0'-6.0'		BR.FINE-CRS.SAND	
5					5.0'	
	4	5-5-6-6	6.0'-8.0'		BR.FINE SAND	
					7.0'	
	5	7-6-6-8	8.0'-10.0'		BR.MED-CRS.SAND	
10					10.0'	
					BOTTOM OF BORING 10.0'	
					**ASPHALT	
15					***TRAPROCK	
20						
25						
30						
5						
0						

LEGEND: Col A

Sample Type
D = Drv C = Cored W = Washed
UP = Undisturbed Piston
TP = Test Pit A = Auger V = Vane Test
UT = Undisturbed Thinwall

Proportions Used		Cohesionless Density	Cohesive Consistency
trace	0 to 10%	0-10 Loose	0-4 Soft
little	10 to 20%	10-30 Med.Dense	4-8 M/Stiff
some	20 to 35%	30-50 Dense	8-15 Stiff
and	35 to 50%	50 + VeryDense	15-30 V-Stiff

140lb Wt. x 30" fall on 2" O.D Sampler

Driller URSIN
Helper
Inspector
Sheet 1 of 1

1 Unless otherwise agreed *samples* will be held by Welti Associates a maximum of 60 days after boring completion
2 *Water readings* represent driller observations — not interpretations

CLARENCE WELTI ASSOC., INC. P O BOX 397 GLASTONBURY, CONN 06033	CLIENT PRATT & WHITNEY	PROJECT NAME F&O PROJ.NO.90-531 LOCATION EAST HARTFORD, CT

DRILLING PROCEDURES 1 (1, 2, 3, 4 (Select one or more))

1 HOLLOW STEM AUGER. Diameter 3.75"
2 DRIVEN CASING. Diameter
3 DRILLED CASING. Diameter
4 ROCK CORING. Diameter & type

HOLE NO. B-14 Surface Elevation

GROUND WATER OBSERVATIONS
AT 10.5' FT AFTER 0 HOURS
AT FT AFTER HOURS

START DATE 11/26/90
FINISH DATE 11/26/90

DEPTH	SAMPLE NO	SAMPLE BLOWS/6"	SAMPLE DEPTH	A	STRATUM DESCRIPTION + DEPTH	REMARKS
	1	6-5-5-4	1.0'-3.0'		** 0.3'	
					*** 1.0'	
	2	3-2-2-4	3.0'-5.0'			
5	3	5-6-6-7	5.0'-7.0'		BR.FINE-CRS.SAND	
	4	6-6-5-5	7.0'-9.0'		7.0'	
	5	6-6-7-8	9.0'-11.0'		BR.FINE-CRS.SAND, LITTLE FINE GRAVEL	
10					11.0'	
					BOTTOM OF BORING 11.0'	
					**ASPHALT	
15					***TRAPROCK	
20						
25						
30						
35						
40						

LEGEND: Col A

Sample Type
D = Dry C = Cored W = Washed
UP = Undisturbed Piston
TP = Test Pit A = Auger V = Vane Test
UT = Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140lb Wt. x 30" fall on 2" O.D Sampler

Cohesionless Density	Cohesive Consistency
0-10 Loose	0-4 Soft
10-30 Med.Dense	4-8 M/Stiff
30-50 Dense	8-15 Stiff
50 + Very Dense	15-30 V-Stiff

Driller URSIN
Helper
Inspector
Sheet 1 of 1

1 Unless otherwise agreed, *samples* will be held by Welti Associates a maximum of 60 days after boring completion
2 *Water readings* represent driller observations — not interpretations

CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033	CLIENT PRATT & WHITNEY	PROJECT NAME F&O PROJ.NO.90-531 LOCATION EAST HARTFORD, CT

DRILLING PROCEDURES 1 (1 2 3 4 (Select one or more))

1 HOLLOW STEM AUGER Diameter 3.75"
2 DRIVEN CASING. Diameter
3 DRILLED CASING. Diameter
4 ROCK CORING. Diameter & type

HOLE NO. B-15 | Surface Elevation

GROUND WATER OBSERVATIONS
AT 10.5' FT AFTER 0 HOURS
AT FT AFTER HOURS

START DATE 11/27/90
FINISH DATE 11/27/90

DEPTH	SAMPLE NO	SAMPLE BLOWS/6"	SAMPLE DEPTH	A	STRATUM DESCRIPTION + DEPTH	REMARKS
	1	3-8-6-4	1.0'-3.0'		** 0.2'	
					*** 0.5'	
	2	2-3-3-4	3.0'-5.0'		**** 2.5'	
					BR.FINE-CRS.SAND	
5	3	3-3-3-4	5.0'-7.0'		5.0'	
					***** 6.0'	
	4	3-3-4-6	7.0'-9.0'		BR.FINE-CRS.SAND,TR.FINE GRAVEL LAYERS	
					8.0'	
	5	6-5-6-8	9.0'-11.0'		****** 9.0'	
10					BR.FINE-CRS.SAND	
					11.0'	
					BOTTOM OF BORING 11.0'	
					**ASPHALT	
15					***TRAPROCK	
					****BLK.& DRK/BR.FINE-MED.SAND	
20					*****BR.FINE SAND,LITTLE SILT	
					******BR.FINE SAND	
25						
30						
35						
40						

LEGEND: Col A

140lb Wt. x 30" fall on 2" O.D Sampler

Sample Type	Proportions Used	Cohesionless Density	Cohesive Consistency
D = Dry C = Cored W = Washed	trace 0 to 10%	0-10 Loose	0-4 Soft
UP = Undisturbed Piston	little 10 to 20%	10-30 Med.Dense	4-8 M/Stiff
TP = Test Pit A = Auger V = Vane Test	some 20 to 35%	30-50 Dense	8-15 Stiff
UT = Undisturbed Thinwall	and 35 to 50%	50 + Very Dense	15-30 V-Stiff

Driller URSIN
Helper
Inspector
Sheet 1 of 1

1. Unless otherwise agreed, *samples* will be held by Welti Associates a maximum of 60 days after boring completion
2. *Water readings* represent driller observations — not interpretations.

DIVISION 2 - SITEWORK

SECTION 02513 - BITUMINOUS PAVING

1. GENERAL

1.01 INCLUSIONS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification sections, apply to work specified in this section.

1.02 SCOPE

Provide all labor, materials, equipment and services and appliances for the work of this Section as shown on the drawings and/or as specified herein. The work shall include, but not be limited to the following:

A. Processed aggregate base under all bituminous paving.

B. New bituminous paving.

1.03 STANDARD SPECIFICATIONS

The term "Standard Specifications" as referred to in this Section shall mean the "Standard Specifications for Roads, Bridges and Incidental Construction", Form 814 by the State of Connecticut - State Dept. of Transportation.

2. MATERIALS

2.01 Processed aggregate base shall conform to Section M.05.01 of the Standard Specifications.

2.02 Bituminous concrete paving mixes shall conform to Section M.04.01 of the Standard Specifications, using Class 1 for binder course and Class 2 for surface paving.

3. EXECUTION

3.01 PAVEMENT BASE

A. For areas designated on the drawings to be paved, processed aggregate base shall conform to requirements of Section 3.4 of the Standard Specifications. Base shall be minimum 12 inches deep, placed in 6-inch layers. Existing pavement which was removed for excavation may be ground and used for this purpose.

B. Under all areas to receive a two course bituminous concrete pavement, the subgrade shall be prepared parallel to and 16 inches below finished grade and thoroughly compacted. Over the finished subgrade construct a two layer base course of 6 inches each for a total depth after compaction of 12 inches. Each base course layer shall be compacted after the material is spread in place, water added, and compacted until the voids in the aggregate have been reduced to a minimum obtainable. Brooms shall be used during the wetting and compacting to distribute any fines uniformly over the surface.

3.02 BITUMINOUS PAVEMENT

A. Bituminous pavement shall be constructed to drain as shown on drawings and shall meet all existing grades where new work adjoins existing paving. The paving shall be a compacted 2 inch thick first course of Class 1 mix and a compacted 2 inch thick surface course of Class 2 mix. All bituminous concrete shall be applied in accordance with Section 4.6 of the Standard Specifications.

B. Bituminous concrete pavement shall be constructed upon a thoroughly compacted aggregate base as specified above.

C. Existing bituminous pavement edges shall be cut in clean straight lines and edge surfaces coated with asphalt for joining with new bituminous concrete.

D. Bituminous surface course shall be rolled smooth and firm, graded to completely drain all surfaces, and shall meet all existing grades where new work adjoins.

E. The Contractor shall notify the Town of East Hartford Engineering Division, 24 hours prior to beginning any paving, to schedule inspections. The division can be reached between 8:30 AM - 4.:30 PM at 291-7380.

END OF SECTION

DIVISION 2 - SITEWORK

SECTION 02713 - BURIED PIPING SYSTEMS

1. GENERAL

1.01 INCLUSIONS

The General Conditions, Contract Drawings, the terms and conditions of the Contract Agreement, and applicable portions of Division 1 are a part of this section.

1.02 SCOPE

Provide all labor, materials, equipment and services for the work of this Section as shown on the drawings and/or as specified herein. The work shall include, but not be limited to the following buried piping and utilities:

A. Preinsulated steam line
B. Preinsulated condensate line
C. Fire protection lines
D. Potable water line
E. Non-potable Water line
F. Electrical conduits
G. Compressed air line
H. Storm Sewer
I. Sanitary Sewer

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Removals, in Section 01045
B. Earthwork, in Section 02220
C. Mechanical General Provisions, in Section 15010
D. Cleaning and Testing Pipe and Equipment, in Section 15051
E. Plumbing, in Section 15400
F. Fire Protection System, in Section 15500
G. Steam and Condensate System, in Section 15610

1.04 DATA GIVEN

Drawings listed in Section 00851 show data of existing conditions based on best information available, and Engineer or United will not be responsible for accuracy of data submitted. Submission of a proposal by the Contractor binds him to accept the site as it actually is, and perform work as shown on Drawings or specified herein.

1.05 SUBMISSIONS

The Contractor shall submit for approval shop drawings for all piping systems showing data on materials of construction, jointing methods, dimensions, sizes, operating clearances, and accessories for all piping to be employed in the work. Also, thermal expansion calculations and a letter of certification from the manufacturers stating that the piping systems can withstand the stresses due to thermal expansion for all steam and condensate piping systems. The manufacturers shall also provide certification that the piping has been properly installed following inspection of the installation.

2. PRODUCTS

2.01 MATERIALS FOR BURIED PIPING & CONDUIT

A. Underground steam and condensate lines, as indicated on contract drawings, shall be the drainable and dryable pre-insulated type, as manufactured by PERMA-PIPE a sole source supplier. All straight sections, fittings, anchors and other accessories shall be factory prefabricated to job dimensions and designed to minimize the number of field welds. Each system layout shall be computer analyzed by the piping system manufacturer to determine stresses on the carrier pipe and anticipated thermal movement of the service pipe. The system design shall be in strict conformance with ANSI B31.1, latest edition. Factory trained field supervision shall be provided for the critical periods of installation, i.e. unloading, field joint instruction and testing. Pipe manufacturer shall provide oversize conduit where necessary to accommodate thermal expansion. Particular attention shall be paid to tie-in points of existing lines which were supplied by PERMA-PIPE under a separate contract (Perma-Pipe Job No. PC-3464). Pipe, insulation and conduit shall be as follows:

Service	Pipe Size	Insulation Thickness	Conduit Size
Steam	4" sch. 40 carbon steel ANSI A-106 or ASTM A53 grade B seamless, butt welded end connections	1½" calcium silicate	10 3/4" 10 gage steel
Condensate	2" sch. 80 carbon steel ANSI A-106 or ASTM A53 grade B seamless, butt welded end connections	1½" calcium silicate	8 5/8" 10 gage steel

End seals, gland seals, risers and anchors shall be designed and factory prefabricated to prevent the ingress of moisture into

the system All sub-assemblies shall be designed to allow for complete draining and drying of the conduit system.

Changes in casing size, as required at oversized casing to allow for carrier pipe expansion, shall be accomplished by eccentric and/or concentric fittings and shall provide for continuous drainage.

The conduit system sections shall be covered with an asphalt or coal tar based coating. Quality control at the manufacturing facility shall ensure that all coatings are able to pass a 10,000 volt holiday test. The coating shall be mechanically applied onto a shot blasted and primed steel conduit. All coatings shall be reinforced with saturated fiberglass and wrapped with an asphaltor coal tar impregnated pipeline felt. All field joints shall be insulated and provided with a welded steel sleeve. Steel closure sleeve shall be protected by a brush-on coating.

All pipes within the outer casing shall be supported at not more than 10 foot intervals. These supports shall be designed to allow for continuous airflow and drainage of the conduit in place. The straight supports shall be designed to occupy not more than 10% of the annular air space. Supports shall be of the type where calcium silicate pipe insulation thermally and electrically isolate the carrier pipe from the outer conduit. Supports which directly contact both the carrier pipe and the outer casing shall not be allowed. The surface of the insulation shall be protected at the support by a metal sleeve not less than 12 inches (300 mm) long, fitted with traverse and, where required, rotational arresters.

B. Fire main piping and non-potable water piping for buried service shall be ductile iron thickness Class 50 centrifugally cast in metal molds to conform to ANSI Specification A21.51 with mechanical joints. Pipe for water main shall be cement-lined to ANSI Specification A21.4 and shall be bituminous coated inside and outside. Fittings for buried service shall be Class 250 ductile iron conforming to ANSI Specification A21.10 with mechanical joints. Retainer glands for pipe anchorage shall be used at all joints and shall be Megalug as manufactured by EBAA Iron Sales. Ductile iron pipe and fittings shall be inspected and tested at foundry as required by ANSI Specifications to which material is manufactured. Contractor shall furnish in quadruplicate to United, sworn certificates of such tests.

Gate valves for buried service shall be iron body, bronze mounted, double disc, parallel seat, non-rising stem with mechanical joint ends. Where indicated valves shall be equipped

with an approved indicator post. Valves and fittings shall conform to UL, FM and AWWA C500 requirements. Buried valves other than PIV shall be furnished with stationary extension operating rods terminating in a two-inch square nut and a sliding type valve box with cover. A tamper switch shall be installed on the PIV valve.

Fittings for connections to existing buried fire mains shall be provided on the basis that the connections will be made by de-pressurizing and cutting the existing lines. Fittings shall consist of tees and mechanical joint sleeve type couplings as required.

C. Buried potable water pipes shall be Type K copper, ASTM B-88, with flared fittings.

D. All conduits for power wiring of all voltages shall be rigid galvanized steel conduit. A pull wire shall be provided in each conduit.

E. Buried air piping shall be ANSI A-106 or ASTM A-53 seamless carbon steel, schedule 40, PVC covered equal to x-tru-coat, with butt welded connections.

F. Buried piping for storm drains shall be reinforced concrete pipe per ASTM C-76 and C-655 Class IV specifications as manufactured by Leonard Concrete Pipe Co. Inc., or equal, except roof drains shall be Class 50 ductile iron. Catch basin and manholes shall be as specified in "Standard Specifications for Roads, Bridges and Incidental Construction", Form 813 by the State of Connecticut Department of Transportation per Section M.08.02.

G. Buried piping for sanitary sewer shall be plastic pipe AWWA C-900 watertight pipe (blue brute) as manufactured by J-M Manufacturing Co. Inc., or equal.

The piping systems shall be installed in strict accordance with instructions supplied by the manufacturer and the requirements of sub section 3 of this specification. The connection fittings, anchor fittings and end fittings shall be designed by the manufacturer of the pipe.

2.02 MATERIALS HANDLING

A. Materials delivered to site shall be inspected for damage, unloaded and stored with the minimum of handling. Store materials on site in enclosures or under protective coverings. Store rubber gaskets under cover out of direct sunlight. Do not

store materials directly on ground. Inside of pipes and fittings shall be kept free of dirt and debris.

B. Pipe, conduits, fittings, valves and other accessories shall be handled in such manner as to insure delivery to the trench in sound undamaged condition. Special care shall be taken not to injure pipe coatings or linings. If coatings or linings of pipe or fittings are damaged, satisfactory repairs shall be made at no extra cost to United. Pipe shall be carried to the trench and not dragged.

3. INSTALLATION

3.01 GENERAL REQUIREMENTS FOR EXTERIOR PIPE LAYING

Pipe, fittings, valves and accessories will be carefully inspected by United before and after installation and those found defective shall be rejected. Pipe and fittings shall be free from fins and burrs. Before being placed in position, pipe, fittings, valves and accessories shall be cleaned, and shall be maintained in a clean condition. Proper facilities shall be provided for lowering sections of pipe into trenches. Under no circumstances shall pipe, fittings, valves or any other water line material be dropped or dumped into trenches. Pipe shall be cut accurately to measurements established at the site and shall be worked into place without springing or forcing. Any pipe or fitting that does not allow sufficient space for proper installation of jointing material shall be replaced by one of proper dimensions. Blocking or wedging between bells and spigots will not be permitted. Bell and spigot pipe shall be laid with the bell end pointing in the direction of laying. Pipe shall be supported at its proper elevation and grade, care being taken to secure firm and uniform support. Wood support blocking will not be permitted. The full length of each section of pipe and fittings shall rest solidly on the pipe bed, with recesses excavated to accommodate bells, joints, and couplings. Anchors and supports shall be provided where necessary, where specified, and where indicated for fastening work into place. Trenches shall be kept free of water until joints have been properly made. Open ends of pipe at the end of each day's work shall be closed temporarily with bulkheads. Pipe shall not be laid when conditions of trench or weather are unsuitable.

3.02 CONNECTIONS TO EXISTING LINES

Connections to existing lines shall be made in a manner approved by United and shall be accomplished with a minimum interruption of service on the existing line and in no case, shall service be interrupted without first obtaining approval from United in writing.

3.03 INSTALLATION OF POTABLE WATER LINE

A. Pipe joints shall be flared fittings.

B. The contractor shall disinfect the potable water line in accordance with AWWA Standard C 601 unless otherwise directed by United.

C. The contractor shall test the water lines as noted in Section 15051, Cleaning and Testing Pipe and Equipment.

D. Bedding and backfilling shall be as noted in Section 02220, Earthwork, and as indicated on drawings.

3.04 INSTALLATION OF STEAM AND CONDENSATE LINES

The installing contractor shall handle the system in accordance with the directions furnished by the manufacturer and as approved by United. The casing shall be air tested at 15 PSIG (1.05 kg/sq. cm) and the service piping shall be hydrostatically tested to 150 PSIG (10.5 kg/sq.cm.). The test pressure shall be held for not less than one hour. The Contractor shall holiday test the entire conduit system at a voltage of 10,000 volts. All holidays shall be repaired and tested.

3.05 CONNECTIONS TO EXISTING FIRE MAINS

Connections to existing lines shall be made in a manner approved by United and shall be accomplished with a minimum interruption of service on the existing line and in no case, shall service be interrupted without first obtaining approval from United in writing.

3.06 INSTALLATION OF DUCTILE IRON PIPE, VALVES AND APPURTENANCES

A. Ductile iron pipe shall be placed on sand bedding as specified in Section 02220. Depth of burial shall be as indicated on drawings.

B. Mechanical joints shall be made in accordance with the requirements of AWWA C600; mechanical joints shall, further, follow the "Notes on Installation of Mechanical Joints" given in ANSI A21.11 (AWWA C111).

C. The installation of valves and appurtenances shall be in accordance with manufacturer's instructions.

3.07 INSTALLATION OF STORM AND SANITARY SEWER

A. Pipe and fittings shall be installed in accordance with manufacturer's instructions.

B. Bedding and backfilling shall be as specified in Section 02220, Earthwork, and as shown on drawings.

C. The contractor shall notify the Town of East Hartford Engineering Division 24 hours prior to beginning any storm drainage to schedule inspections. The Division can be reached between 8:30 A.M. - 4:30 P.M. at 291-7380.

3.08 BURIED PIPE ANCHORAGE

Anchorage of buried ductile iron piping shall be by means of retainer glands as indicated on drawings. Retainer glands shall be Megalug as manufactured by EBAA Iron Sales, Inc., Eastland, Texas. Retainer glands for pipe anchorage shall be used at all joints on pipe and fittings.

3.09 FLUSHING OF BURIED PIPING

The fire main shall be flushed with clear water until clean and acceptable to United. Flushing shall be in accordance with NFPA 24.

3.10 TESTING OF PIPE IN PLACE

A. All new buried piping shall be tested in sections of approved lengths. For these tests, United will furnish clean water and necessary gages. Contractor shall furnish suitable plugs or caps and other similar equipment and all labor required without additional compensation.

B. The test pressure shall be 200 psig for air, potable and non-potable water lines.

C. The Contractor shall conduct pressure tests and leakage tests in accordance with NFPA 24 unless otherwise directed by United. Hydrostatic test shall for two hours at 200 psig with joints exposed.

D. Steam and condensate lines shall be tested in accordance with Paragraph 3.04.

END OF SECTION

DIVISION 3 - CONCRETE

SECTION 03300 - CAST-IN-PLACE CONCRETE

1. GENERAL

1.01 SCOPE

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification sections, apply to work specified in this section.

1.02 DESCRIPTION OF WORK

A. The Work to be done shall, in general, consist of the following major items; (minor Work, Work incidental to or arising from other parts of this Work may not be listed hereunder but shall be included as may be necessary for the full completion of the job).

1. Furnishing, placing and finishing of Cast-in-Place Concrete and reinforcing steel for foundations and floor slabs as shown and detailed on the Drawings and as specified herein.

2. Placing of all cast-in items such as anchor bolts, angles, clips, inserts, and the like.

3. Protecting of the finished concrete work against damage due to other work of the project.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Section 04200 - Unit Masonry

B. Section 05100 - Structural Steel

C. Section 05500 - Metal Fabrications

D. Section 09950 - Protective Coatings

E. Section 11161 - Dock Levelers

1.04 GENERAL REQUIREMENTS

A. All Work of this Section shall be provided in accordance with A.C.I. 318-89 Building Code

Requirements for Reinforced Concrete.

B. Examine all drawings and data and coordinate the Work of this Section with all related and adjoining Work.

C. Standard tests of the cement, aggregate, concrete and reinforcement will be conducted by an independent testing laboratory. The Contractor shall furnish the material for all required samples and labor as requested for obtaining samples. He shall provide to the authorized representatives of the Owner convenient access to all parts of the Work and to all concreting operations for the purpose of sampling and inspection.

D. The mix design, placing of concrete, production of finishes and final curing shall be so executed as to produce as near perfection as possible and a uniform finished product for all exposed concrete.

1.04 SUBMITTALS

A. Shop drawing and sample submittals shall be in accordance with Section 01300, Submittals.

B. This Contractor shall submit shop drawings for all reinforcing steel. Drawings shall show bending diagrams, splicing and laps of rods, shapes, dimensions, details of bar reinforcing and accessories. Shop Drawings must be reviewed by the Engineer before proceeding with the Work. Shop Drawings shall show all openings where stairs, ducts, etc. pass through floor.

C. Manufacturers of admixtures used in the concrete mix must review and approve the mix design before it is submitted.

C. Submit samples for products and accessories if requested.

2. PRODUCTS

2.01 MATERIALS

A. Cement for walls and footings shall be a Portland cement conforming to ASTM Standard C-150, Type I or

II. One brand of cement shall be used throughout the project.

B. Admixtures shall be used only when and as approved by the Engineer. Calcium chloride or admixtures containing chloride salts shall not be added to concrete. Where protective coatings will be bonded to the concrete, the coating manufacturer must approve, in writing, the type and brand of admixture used.

1. Air-entraining admixture shall conform to ASTM C260.
2. Accelerating admixtures shall not be used.
3. Water reducing or retarding admixtures shall conform to ASTM C494, Type A, B, or D.
4. High-range water reducing admixtures for containment slabs and walls shall conform to ASTM C 494, Type F.
5. Silica fume mineral admixture for containment slabs and walls shall be MB-SF, manufactured by Master Builders.

C. Water shall be potable, clean and free from injurious amounts of oil, acid, alkali, organic matter or other deleterious substances and conforming to ASTM C 94.

D. Aggregates shall conform to the provisions and test methods of ASTM Standard C33.

E. Reinforcing steel shall conform to:
1. ASTM A615, Grade 60 for reinforcing bars.
2. ASTM A185, for welded wire fabric.

F. Moisture-retaining cover for slab curing shall be polyethylene film or waterproof paper conforming with ASTM C 171. Curing compounds will not be permitted on any concrete surfaces. Submit sample.

F. Waterstops: CRD-C 572, polyvinyl chloride, 6 in., serrated with center bulb, or 4 in., serrated without center bulb, where indicated on plans. Submit sample.

G. Reinforcing bar supports shall be as detailed in CRSI Manual of Standard Practice. Over waterproof membranes and vapor barriers, use precast concrete chairs or other devices which will not penetrate membrane. Submit sample.

H. Welded wire mesh supports shall be capable of returning the mesh to its original position after being depressed. Submit sample.

I. Wall forms shall be tightly butted and aligned steel forms. Form release agents for formed containment surfaces must be approved by protective coating manufacturer.

J. Form ties, anchors and hangers shall be of sufficient strength to completely resist displacement of forms due to construction loads and concrete pressures. Provide tie and spreader form ties designed so no metal will be within 1-1/2 in. of surface. Use water seal ties in all containment walls. Submit samples.

K. Vapor barrier shall be six mil polyethylene film with a permeability not more than 0.3 perms and shall be resistant to decay when tested by ASTM E 154. Submit sample.

L. Preformed joint filler in joints of slabs not receiving protective coating shall be full depth of concrete and shall conform to ASTM D 1751, nonextruding.

M. Joint filler in slabs receiving protective coating shall be semi-rigid epoxy equal to MM-80 by Metzger-McGuire Co.

N. Slab-on-grade construction joint dowels shall be smooth, round bars, ASTM A36, with half-length of bar in second pour greased.

O. Non-shrink grout shall be Embeco 630 by Master Builders, or equal.

2.02 PROPORTIONING OF CONCRETE

A. Use only materials and their proportions included on approved mix design reports for this project. Mix design shall be determined in accordance with ACI 301.

B. Concrete which is scheduled to receive protective coating shall be silica fume concrete and shall be proportioned on the basis of laboratory or field trial batches. Other concrete may be proportioned either by trial batch method or by using a design mix supported

by a satisfactory performance record in conformance with ACI 318-89.

C. All containment concrete shall have a minimum 28 day compressive strength of 4000 psi. All other concrete shall have a 28 day strength of 3300 psi minimum.

D. Concrete shall have proper consistency to be worked readily into forms and around reinforcement without segregation, voids, or excessive bleeding.

E. Unless approved by United, concrete shall meet the limiting requirements below:

Concrete type	w-c ratio	Cement factor
Containment	0.45 max.	6.5 bags/cy
Other	0.45 max.	5.8 bags/cy

F. Air entrainment shall be 4-6% for exterior concrete and 3-5% for interior concrete.

G. Coarse aggregate size shall be as large as permitted by transport and placing methods but shall not exceed 1/2" for column encasement or 1 1/4" for all other concrete.

H. Maximum slump shall be 8 in. +/- after adding high-range water-reducing admixture and 4 in.+/- for other concrete.

3. EXECUTION

3.01 GENERAL

A. Provide for qualified representatives of the following manufacturers to supervise initial installation of their materials:
   1. High-range water-reducing admixture.
   2. Waterstops and their splices.

3.02 MIXING AND PLACING CONCRETE

A. Ready-mix concrete shall be mixed and placed in accordance with ASTM C 94 and ACI 301.

B. Do not place concrete unless temperature is at least

45F and rising. Comply with ACI 306R and 306.1 for cold weather concreting.

C. If temperature is greater than 85F, comply with ACI 305R for hot weather concreting.

D. Handle concrete from mixer to place of final deposit as rapidly as practicable and in a manner which will assure achievement of specified quality.

E. Place concrete continuously between construction joints to assure monolithic sections of concrete free of cold joints. Deposit concrete as near as possible to its final position. Use elephant trunks for drops over 4 ft.

G. Consolidate concrete, complying with ACI 309 by vibrating, spading or rodding so that concrete is thoroughly worked around reinforcing and embedded items and into the corners of forms. Do not over-vibrate concrete with high-range water-reducing admixtures.

3.03 REINFORCEMENT

A. Fabricate reinforcing in accordance with ACI 315 and ACI 315R.

B. Place reinforcing in accordance with ACI 117 and 318 and CRSI Manual of Standard Practice and Placing Reinforcing Bars. Support bars and wire mesh to maintain locations shown on plans.

C. Reinforcement shall be continuous through construction joints unless otherwise specified.

3.04 FORMWORK

A. Clean all formwork. Remove rust from steel formwork.

B. Chamfer all exposed external corners 3/4 in.

C. Solidly butt joints and provide backup at joints as required to prevent leakage of cement paste.

D. Coat contact surfaces with a form release agent approved by the protective coating manufacturer.

E. Support and brace formwork to maintain proper position and alignment.

3.05 JOINTS

A. Construction joints and isolation joints in containment areas shall be located and constructed as shown on plans. Construction joints in non-containment walls shall not be more than 80 ft. apart.

3.06 PRODUCT INSTALLATION

A. Install vapor barrier under slabs-on-grade where shown on drawings. Lap at least 6 in. and seal with pressure sensitive tape. Repair all tears and punctures.

B. Install anchor bolts and other embedded items provided by others. Use templates to assure proper position. Support embedded items securely to prevent displacement during concrete placement.

C. Install waterstops as detailed and support as required to prevent displacement. Provide fully welded splices and intersections to maintain integrity of containment.

D. Install preformed joint fillers as slab edges where indicated on plans. Recess with removable strip as required to provide slot for joint sealant.

E. Install semi-rigid epoxy joint filler in sawcut grooves in strict accordance with manufacturers instructions.

F. Open items, such as pipe sleeves for railings, shall be capped or filled with easily removed materials before placing concrete.

G. Non-shrink grout for use under base plates, under overhead door sill plate assemblies, under equipment bases and other applications as required, shall be mixed and placed in accordance with manufacturers instructions for the particular application.

3.07 FINISHES

A. Containment slabs (all slabs which will receive

protective coating) shall be carefully placed to final elevations that will assure positive drainage to sumps. Accurate vertical control must be provided during slab placement to achieve the required slopes. Level concrete to final grade with bull floats and darbies. After bleed water is gone and concrete can sustain worker's weight, float slab two times, second float at right angles to first. Do not use power trowels. Cure slab with polyethylene membrane for at least 7 days. After slab has attained at least 3000 psi strength, mechanically roughen slab surface to a coarse sandpaper texture acceptable to the protective coating manufacturer.

B. Other interior slabs shall be power troweled after floating and membrane cured for at least 7 days.

C. Exterior stairs and platforms shall be broom finished after floating, then cured for 7 days.

D. Formed surfaces shall be cured by leaving forms in place for 7 days. Immediately after removing forms, remove fins and irregular projections from all surfaces which will be exposed. Patch all tie holes and surface defects with a mortar of cement and sand mixed in proportions used in concrete. Roughen surface as required by protective coating manufacturer.

E. Strike flush and float tops of walls and similar unformed surfaces to obtain texture consistent with that of adjacent formed surfaces.

3.08 TESTING CONCRETE

A. The Engineer will require tests to be made during the progress of the Work. No less than 4 specimens shall be made for each test, nor less than one test for each 50 cy pour, nor less than one test per day.

B. Specimens shall be made and cured in accordance with the "Standard Method of making the Curing Concrete, Compression and Flexure Test Specimens in the Field", ASTM C31. Specimens shall be cured under laboratory conditions and when in the opinion of the Engineer unusual conditions may tend to reduce the strength of the concrete, the Engineer may require additional

specimens to be cured under field conditions.

C. Testing for concrete strength shall be done by a qualified testing laboratory as selected by the Contractor and approved by United. The Contractor will be reimbursed for the actual cost of testing services, plus markups, as provided in the Proposal. The Contractor shall accept printed test results of the testing laboratory as representing the character of the concrete in place.

D. Results of 28-day tests.

1. Where the average strength of the cylinders falls below the required strength for any portion of the structure, the Engineer may require at the Contractor's expense:

   a. Test in accordance with the "Standard Method of securing, preparing and testing specimens from Hardened Concrete for Compressive and Flexural Strength" ASTM C 42.

   b. Load tests for that portion of the structure where the questionable concrete has been placed.

E. Load Tests - When a load test is required, the detailed procedures for such tests as outlined in the "Building Code Requirements for Reinforced Concrete" (ACI 318, latest edition) shall apply.

END OF SECTION

DIVISION 3 - CONCRETE

SECTION 03400 - PRECAST CONCRETE PLANK

1. GENERAL

1.01 SCOPE

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification sections, apply to work specified in this section.

1.02 DESCRIPTION OF WORK

A. The Work to be done shall, in general, consist of the following major items; (minor Work, Work incidental to or arising from other parts of this Work may not be listed hereunder but shall be included as may be necessary for the full completion of the job).

1. Furnishing, erecting, and anchoring of precast, prestressed concrete floor plank as shown and detailed on the Drawings and as specified herein.

2. Placing of reinforcing bars in and between planks where required in details and grouting of joints between plank units.

3. Furnishing and installing: headers at floor openings, bearing strips, and other accessories as may be required for completion of the work of this Section.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Section 03300 - Cast-in-Place Concrete

B. Section 04200 - Unit Masonry

1.04 GENERAL REQUIREMENTS

A. All Work of this Section shall be provided in accordance with A.C.I. 318-89 Building Code Requirements for Reinforced Concrete and with the P.C.I. Design Handbook, Second Edition.

B. Examine all drawings and data and coordinate the work

of this Section with all related and adjoining work.

C. The precast concrete manufacturing plant shall be certified by the Prestressed Concrete Institute, Plant Certification Program, prior to the start of production.

D. The precast concrete erector shall have been regularly engaged in the erection of precast structural concrete for at least for at least five years.

E. Quality control shall be in compliance with MNL-116, Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products.

1.05 SUBMITTALS

A. Shop drawing submittals shall be in accordance with Section 01300, Submittals.

B. Submit shop drawings for all precast concrete planks. Drawings shall show setting plan, reinforcement, slab designations, connection details, design loads, and special erection requirements, if any.

C. Submit design calculations performed by a professional engineer registered in the State of Connecticut.

2. PRODUCTS

2.01 MATERIALS:

A. Cement shall, be a Portland cement conforming to ASTM Standard C-150, Type I or III.

B. Air entraining admixture: ASTM C260. Water reducing, retarding, accelerating admixtures: ASTM C494.

C. Water shall be potable, clean and free from injurious amounts of oil, acid, alkali, organic matter or other deleterious substances.

D. Aggregates shall conform to the provision and test methods of ASTM Standard C33 or C330.

E. Reinforcing steel shall conform to:

1. ASTM A615, Grade 60 for reinforcing base.
2. ASTM A185, for welded wire fabric.

F. Minimum compressive strength:
1. At transfer of prestress: 3500 psi
2. At 28 days: 5000 psi.

G. Prestressing strand: ASTM A416, Grade 250K or 270K, 7-wire, stress-relieved strand.

H. Grout: Portland cement, sand, and water sufficient for placement and hydration.

I. Bearing pads: Tempered hardboard, Masonite or equal.

3. EXECUTION

3.01 ERECTION

A. Set bearing strips where required.

B. Set plank units level and square keeping units tight and at right angles to the bearing walls.

C. Form edge of floor, place reinforcing and cast concrete as detailed.

D. Cooperate with other trades in permitting insertion of anchors, hangers, electrical outlets, etc.

3.02 GROUTING

A. Between slab edges, fill grout key and remove any grout that may seep through to underside of plank before it hardens.

B. At slab ends, provide suitable end cap or dam in voids as required.

3.03 HOLES AND ATTACHMENTS

A. Subject to the approval of the Architect/Engineer, plank may be drilled or "shot" provided no contact is made with the prestressing steel. Should spalling occur, it shall be repaired by the trade causing the damage. No holes shall be drilled through prestressing strands.

3.04 CAULKING

A. Apply uniformly and neatly, using no more material than required to fill the joints.

3.05 CLEANING

A. Neatly and fully finish and remove all surplus materials and rubbish attributed to this work.

END OF SECTION

DIVISION 3 - CONCRETE

SECTION 03451 - ARCHITECTURAL PRECAST CONCRETE

1. GENERAL

1.01 SCOPE

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to work specified in this Section.

B. Work by this Section includes, but is not limited to:
   1. Architectural precast concrete.
      a. Window sill wall caps.
      b. Wall caps.
   2. Supports, anchors, and attachments.

1.02 RELATED SECTIONS

A. Section 03300 - Cast-in-Place Concrete.

B. Section 04200 - Unit Masonry.

C. Section 07600 - Flashing and Sheet Metal.

D. Section 07900 - Joint Sealers.

1.03 REFERENCES

A. ANSI/ACI 301 - Specifications for Structural Concrete for Buildings.

B. ANSI/ACI 318 - Building Code Requirements for Reinforced Concrete.

C. ANSI/ASTM C150 - Portland Cement.

D. ANSI/ASTM C260 - Air-Entraining Admixtures for Concrete.

E. ASTM A615 - Deformed and Plain Billet Steel Bars for Concrete Reinforcement.

F. ASTM C33 - Concrete Aggregates.

G. PCI Manual for Structural Design of Architectural Precast Concrete.

H. PCI MNL-117 - Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products.

1.04 DESIGN REQUIREMENTS

A. Design units to withstand design loads as calculated in accordance with 1987 BOCA code with State of Connecticut supplements, and erection forces. Calculate structural properties of units in accordance with ANSI/ACI 318.

B. Design units to accommodate construction tolerances and clearances of intended openings.

1.05 SUBMITTALS

A. Shop drawing, product literature and sample submittals shall be in accordance with Section 01300, Submittals.

B. Shop Drawings: Indicate layout, unit locations, configuration, unit identification marks, reinforcement, support items, dimensions, openings, and relationship to adjacent materials.

C. Samples:
1. Submit two panels, 12 x 12 inch in size illustrating surface finish, color and texture.

1.06 QUALITY ASSURANCE

A. Perform Work in accordance with PCI MNL-116, PCI MNL-123, PCI MNL-120, PCI Manual for Structural Design of Architectural Precast Concrete, and ANSI/ACI 318.

1.07 QUALIFICATIONS

A. Precast Manufacturer and Erectors: Qualified in accordance with PCI MNL-117.

1.08 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, protect and handle products to site.

B. Handle precast units to position, consistent with their shape and design. Lift and support only from support points.

C. Lifting or Handling Equipment: Capable of maintaining units during manufacture, storage, transportation, erection, and in position for fastening.

D. Blocking and Lateral Support during Transport and Storage: Clean, non-staining, without causing harm to exposed surfaces. Provide temporary lateral support to prevent bowing and warping.

E. Protect units to prevent staining, chipping, or spalling of concrete.

F. Mark units with date of production in location not visible to view when in final position in structure.

1.09 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop Drawings.

2. PRODUCTS

2.01 CONCRETE MATERIALS

A. Cement: ANSI/ASTM C150, Portland Type I - Color as required to provide specified color and texture. Color of cement to match color of cement used in exterior ground face concrete block.

B. Concrete Materials: ASTM C33; water and sand. Sand color to match sand used in exterior ground face concrete block.

C. Reinforcing Steel: ASTM A615, deformed steel bars and ANSI/ASTM A185, epoxy coated.

D. Air Entrainment Admixture: ANSI/ASTM C260.

E. Integral Water Repellent: Dry block.

2.02 MIX

A. Concrete: Minimum 5000 psi, 28 day strength, air entrained to 5 to 7 percent in accordance with ANSI/ACI 301. Integral water repellant in accordance with manufacturer's recommendations.

2.03 FABRICATION

A. Layout units in 3'-11-5/8" lengths symmetrically placed in each bay. End units shall be less than 3'-11-5/8" and shall be equal in each bay. Align joints with masonry vertical joints.

B. Fabrication procedure to conform to PCI MNL-117.

C. Maintain plant records and quality control program during production of precast units. Make records available upon request.

D. Use rigid molds, constructed to maintain precast unit uniform in shape, size and finish.

E. Maintain consistent quality during manufacture.

F. Embed reinforcing steel, anchors, inserts plates, angles, and other cast-in items as indicated on shop Drawings.

G. Form units with continuous drip and anchor pin slot.

H. Cure units to develop concrete quality, and to minimize appearance blemishes such as non-uniformity, staining, or surface cracking.

2.04 FINISH - PRECAST UNITS

A. Finish Type: Light acid wash.

2.05 FABRICATION TOLERANCES

A. Conform to PCI MNL-117.

2.06 SOURCE QUALITY CONTROL AND TESTS

A. Provide testing of concrete mix.

B. Take 3 concrete test cylinders for every batch of concrete in accordance with ANSI/ASTM C31.

C. Take one air entrainment test cylinder for each set of exterior concrete test cylinders taken.

3. EXECUTION

3.01 EXAMINATION

A. Verify site conditions.

B. Verify that building structure and openings are ready to receive work of this Section.

3.02 PREPARATION

A. Provide for erection procedures and induced loads during erection.

B. Provide necessary hoisting equipment.

3.03 ERECTION

A. Erect units without damage to shape or finish. Replace or repair damaged panels.

B. Erect units level and plumb within allowable tolerances.

C. Align and maintain uniform horizontal and vertical joints as erection progresses.

D. When units require adjustment beyond design or tolerance criteria, discontinue affected work; advise Architect.

E. Exposed Joint Dimension: 3/8 inch.

3.04 ERECTION TOLERANCES

A. Maximum Variation from Plane of Location: 1/4 inch in 10 feet and 3/8 inch in 30 feet, non-cumulative.

B. Maximum Offset from True Alignment Between Two Connecting Units: 1/16 inch.

C. Joint Tolerance: Plus or minus 1/8 inch.

3.05 ADJUSTING

A. Adjust work.

B. Adjust units so that joint dimensions are within tolerances.

3.06 PROTECTION

A. Protect units from damage.

END OF SECTION

DIVISION 4 - MASONRY

SECTION 04200 - UNIT MASONRY

1. GENERAL

1.01 SCOPE

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to work specified in this Section.

B. Work by this Section includes, but is not limited to:
1. Concrete masonry unit construction.
2. Brick masonry construction.
3. Glass masonry units.
4. Structural glazed tile unit construction.
5. Masonry and Concrete cleaning.
6. Water repellent treatment.

1.02 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

A. Section 03451 - Architectural Precast Concrete: Placement of Precast Concrete.

B. Section 05500 - Metal Fabrications: Placement of loose steel, frames, lintels, anchors, and miscellaneous items.

C. Section 07600 - Flashing and Sheet Metal: Placement of thru wall and counter flashings.

D. Section 07900 - Sealants: Control joints.

1.03 RELATED WORK

A. Section 03451 - Architectural Precast Concrete

B. Section 07160 - Bituminous Dampproofing

C. Section 07213 - Fiberous and Rigid Insulation for walls and slabs

1.04 REFERENCES

A. ASTM C90: Specification for Hollow Load Bearing Concrete Masonry Units.

B. ASTM C144: Specification for Aggregate for Masonry Mortar.

C. ASTM C145: Specification for Solid Load Bearing Concrete Masonry Units.

D. ASTM C150: Specification for Portland Cement.

E. ASTM C216: Specification for Facing Brick.

F. ASTM C270: Specification for Mortar for Unit Masonry.

G. ASTM C404: Specification for Grout.

1.05 SUBMITTALS

A. Shop drawings, product data and sample submittals shall be in accordance with Section 01300, Submittals.

B. Submit product data for flashing, weeps, reinforcement, anchors and compressible fillers.

C. Submit samples of each masonry unit type, and of each color and texture, flashing, weeps, anchors, reinforcement, expansion and control joint materials.

D. Submit full set of mortar color samples.

1.06 MOCK-UP

A. Provide two mock-ups of composite wall system (one of CMU and one of Brick).
   1. Erect CMU composit panel 6' x 6' include specified mortar, anchors, reinforcing, weeps, flashing and accessories, including a control joint, bond beam and precast concrete sill with 2 courses of glass block above.
   2. Erect brick composit sample panel 4'x4' including specified mortar, anchors, reinforcing, weeps, flashing and accessories including a control joint.

B. When accepted, mock-up will demonstrate minimum standard for the Work. Mock-ups may not remain as part of the Work.

1.07 PRE-INSTALLATION CONFERENCE

A. Convene one week prior to commencing work of this Section.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site.

B. Store and protect products.

C. Inspect for damage.

1.09 ENVIRONMENTAL REQUIREMENTS

A. Maintain materials and surrounding air temperature to minimum 50 degrees F prior to, during, and 48 hours after completion of masonry work.

2. PRODUCTS

2.01 MATERIALS

A. Brick:
   1. Brick: Glen Gary, Hanley Plant, S37, Stylo smooth texture, ASTM C216 FBX, Grade SW. Nominal 8 x 8 x 4.

B. Concrete Masonry Units (CMU):
   1. General:
      a. Hollow Units ASTM C90-85, Normal weight, Grade N-1.
      b. Solid Units ASTM C145-85, Normal weight, Grade N-1.
      c. Unless solid or light weight units are required for fire rating or are indicated, use hollow and normal weight units.
      d. Use CMU conforming to requirements of 4-hour and 2 hour fire rated load bearing concrete masonry of one of the agencies approved by the State of Connecticut Building Code. Certify fire resistance rating as noted on drawings.
      e. All CMU units in exterior wall construction, both inner and outer wythes, shall be manufactured with an integral water repellent admixture: "Dry-Block System" as manufactured by Forrer Industries.
      f. Provide bond beam block and finished ends where required.
      g. Corner ground face blocks in 6" exterior wythe shall be made from 8" thick CMU with ground end and face.
   2. Interior Exposed CMU:
      a. Grade: N-1.
      b. Size: Nominal 8" x 16" by thickness shown.
   3. Exterior Exposed CMU:
      a. Grade: N-1.
      b. Size: Nominal 8" x 16" x thickness shown.
      c. Face: Ground.
      d. Color and Texture: Match Plasticrete sample PGF80 in Architects office.

C. Glass Masonry Units (Glass Block)
   1. Hollow Glass Units: Permanently seal hollow unit by heat fusing joint with joint key to assist mortar bond.
      a. Size: Nominal 8 x 8 x 3-7/8 thick.
      b. Color: Clear
      c. Style: Decora by Pittsburgh Corning.
      d. Edge Coating: Brown
   2. Spacers: P.C. glass block spacers.

D. Structural Glazed tile
   1. Manufacturers: Stark Ceramics
   2. Color to be selected from manufacturers full range.
   3. Provide coved base.

E. Mortar and Grout Materials
   1. Portland Cement
      a. ASTM C150-85a: Type I
      b. Color: match specified colors.
         1) Interior CMU: Natural
         2) Exterior CMU: Match cement color in ground face CMU.
         3) Glass Masonry Units and Brick: Color Bond #157.
   2. Hydrated Lime:
      a. ASTM C270-86b: Type S.
   3. Aggregate:
      a. ASTM C144-84.
      b. Light color, medium texture and clean sand free of iron at glass block.
   4. Coloring:
      a. Metalic oxide pigments.
      b. Conforming to ASTM C979.
   5. Water
      a. Potable
   6. Water Repellent Admixture:
      a. Dry-Block mortar admixture manufactured by Forrer Industries at CMU and brick for both interior and exterior wythes in exterior walls.
      b. Sterate type by Sonneborn Building Products at glass block.

2.02 MORTAR AND GROUT MIXES: SUMMARY OF PROPORTIONS BY VOLUME

A. CMU, Structural Glazed Tile and Brick: Type "S" Mortar: 1 part Portland Cement
1/2 part Hydrated Lime
3.5 to 4.5 parts clean light colored sand.

	Water repellent admixture in accordance with manufacturer's recommendations. Provide water repellent admixture in mortar in both inner and outer wythes of cavity wall construction. Coloring - as specified above.
B. Glass Masonry Units, Type S Mortar	2 parts Portland Cement 1/2 part hydrated lime 6 to 7 parts fine Quartzite Sand, color as specified above. Water repellent in accordance with manufacturers recommendations.
C. Grout for Reinforced Bond Beams and vertically reinforced block Cores: Fine grout. Aggregate in accordance with ASTM C404 Fine Size No. 2.	1 Part Portland Cement, 0-1/10 part Hydrated lime, aggregate 2-1/4 to 3 times sum of the volumes of the cementitious materials.

D. Do not use admixtures other than those specified without Architects written approval.

2.03 REINFORCING AND ANCHORS

A. Masonry Reinforcing: Hot dip galvanize after fabrication, 1.25-1.5 oz./square foot.
   1. Single Wythe CMU:
      a. Type: Ladur
      b. Class: Medium
      c. Side Rods: No. 8, deformed
      d. Cross Rods: No. 9
      e. Width: Sized for wall width indicated on drawings.
      f. Provide preformed corners and tees.
   2. Cavity Wall: Masonry/Cavity/Masonry
      a. Type: Double Ladur with drip
      b. Class: Medium
      c. Side Rods: No. 8, deformed
      d. Cross Rods: No. 9
      e. Width: Sized for wall width indicated on drawings.
      f. Provide preformed corners and tees.

3. Glass Masonry:
   a. Type: Ladur
   b. Side Rods: No. 9, 2" apart
   c. Cross Rods: 14 ga. 8" o.c.
   d. Galvanized: 1.25 oz/sf
4. Reinforcing rods for core and bond beam reinforcing shall be epoxy coated.

B. Anchors
1. Column anchors (at steel columns)
   a. Type: Equal to Hohmann & Barnard Inc., 359 series
   b. Gauge: 12 ga.
   c. Size: 3/4" wide by continuous length
   d. Ties: 3/16" diameter vee ties
   e. Material: Hot dipped galvanized steel
   f. Attachment to Wall Reinforcing: Seismiclip
2. Column anchors (concrete encased steel columns)
   a. Type: Equal to Hohmann & Barnard Inc., 315 Series and 305 anchor slot.
   b. Gauge: 12
   c. Size: 3/16" x sized for wall thickness.
   d. Material: Hot dip galvanized steel.
   e. Attachment to wall reinforcing: Seismicup.
3. Glass masonry panel anchors
   a. 20 guage x 1-3/4 inch wide steel strips, punched with three rows of elongated holes, pattern staggered, hot dipped galvanized after fabrication to 1.25 oz/sq. ft. in accordance with ASTM A123.
4. Precast concrete anchor pins: 1/2" diameter solid copper rods or stainless steel rods 8" long.

2.04 CONTROL JOINT FILLER AND COMPRESSIBLE FILLER AT COLUMNS, AND WHERE INDICATED ON THE DRAWINGS

A. Dur-O-Wall rapid expansion joint or approved equal.
1. 3" x 3/8" by full lengths.
2. Compressible prefabricated neoprene.
3. Meeting requirements of ASTM D1056, Class RE41.

B. PC expansion strips at glass block.
1. 4-1/8" x 3/8" x 24" cut to 3" wide.
2. Dense fiberous glass or white polyethelene.

2.05 EXPANSION JOINTS:
1. Neoprene and Copper
   a. Manville: Expando Flash
   b. Wasco: Wascoflex
   c. AFCO: Flexi-Span
   d. Sandel: Sando flash expansion joint.

2.06 FLASHING

A. Concealed flashing built into walls (through wall flashing) - lead coated copper fabric flashing: Products equal to the following are acceptable. Total metal weight 5 oz. per square foot.
   1. Wasco - Copper lead fabric.
   2. AFCO - Cop-A-Lead fabric.
   3. Sandel - Lead Copper flashing.
   4. Pheonix, Type B Cop-R-Flash.
   5. York, Cop-R-Tex Duplex Plus Lead

B. Exposed Flashing and Control Joint Back Up:
   1. Lead coated copper conforming to ASTM B301, Class A, Type 1.
      a. 16 oz. cold rolled copper.
      b. Lead coating on both sides 6 to 7-1/2 lbs. per 100 S.F.

2.07 WEEPS

A. Ultra violet resistent polypropylene copolymer Duro-Wall cell vent D/A 1006. (Full depth of exterior wythe)

2.08 GLASS MASONRY UNIT ACCESSORIES

A. PC glass block spacers.

2.09 PEASTONE

A. Clean, washed, round gravel, 1/4" to 1/2" diameter free of sand.

2.10 CLEANING AGENT

A. Brick: Biodegradable, water soluable cleaner, specifically manufactured for cleaning brick and mortar. Concentration of material shall be adjusted for specific site conditions, stain removal and materials in strict accordance with manufacturers recommendations.

B. CMU: Water, use chemical cleaner, approved by manufacturer, only if necessary.

C. Glass Masonry Units and Structural Glazed Tile: Water and mild detergent as recommended by glass block and glazed tile manufacturers.

2.10 WATER REPELLENT

A. Hydrozo Clear Double 7, ProSoGo - Sureklean Weather Seal Siloxane, Sil-Act by Advanced Chemical Technologies or Pecora - Klere Seal Silane single coat penetrating water repellent designed specifically for brick and block walls or approved equal products meeting the following: Contractor to verify compatibility with mortar additives.

1. Composition; blend of natural oils and resins, silane, siloxane, polymers, stearates and aluminum compounds in a blended solvent.
2. Flash point: ASTM D 3278-82. Greater than 100 Degrees F.
3. Penetration: 1/16 - 3/8 inch (approx.) depending upon substrate.
4. Water Permeance Test of Masonry: Percentage of Reduction Leakage:
   - ASTM E514-74 — 97.8%
   - Masonry Wall — 88.9%
   - Block Wall — 96% (min.)
5. Water Repellency Tests
   - ASTM C67-80a
6. Moisture Vapor Transmission Rate — 24.4 grams/sq. ft./
   - ASTM D1653-72 — 24 hours/77 Deg. F
7. Weatherometer - 2500 hours — 95.3% repellency
8. Outdoor exposure tests — 96.1% repellency
9. Yellowing — None
10. Efflorescence NBS 883 — Highly Resistant
11. Surface Appearance — Unchanged

3. EXECUTION

3.01 EXAMINATION

A. A.N.S.I. Standard A41.1-53 - American Standard Building Code Request for Masonry "is hereby incorporated by reference".

B. Verify that field conditions are acceptable and are ready to receive work.

C. Verify items provided by other Sections of Work are properly sized and located.

D. Verify that built-in items are in proper location, and ready for roughing into masonry work.

E. Beginning of installation means installer accepts existing conditions.

3.02 PREPARATION

A. Direct and coordinate placement of metal anchors supplied to other Sections.

B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.03 COURSING

A. Establish lines, levels, and coursing indicated. Protect from displacement.

B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

C. Lay brick units in stacked bond. Tool mortar joints concave.

D. Lay CMU and Structural Glazed Tile units in running bond with concave mortar joints.

E. Lay glass masonry units in stacked bond with concave tooled mortar joints.

3.04 PLACING AND BONDING

A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other Work.

B. Buttering corners of joints or excessive furrowing of mortar joints are not permitted.

C. Remove excess mortar as Work progresses.

D. Interlock intersections and external corners.

E. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

F. Tool joints when thumb print hard.

G. Perform jobsite cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

H. Separate masonry partitions from vertical and horizontal structural framing members with a compressable filler. Provide anchors as specified below.

I. Build all walls to structure and roof deck above. Build around trusses, beams and other structural elements.

J. Fill cores of block solid with mortar:
   1. At first two cores adjacent to openings, and door frames from floor to top of opening. Fill door frames solid with mortar.
   2. Grout vertical cores solid at vertical reinforcing at piers and where shown on drawings.
   3. Grout bond beams solid.

3.05 WEEPS AND PEA STONE

A. Install weep holes in exterior wythe at 32 inches on center horizontally above through-wall flashing, above shelf angles, and at bottom of walls.

B. Provide 6" depth of pea stone at flashing in all locations.

3.06 CAVITY WALL CONSTRUCTION

A. Do not permit mortar to extend beyond rear face of masonry or to drop or accumulate into cavity air space or to plug weep holes. Maintain cavity clean of mortar and debris.

3.07 REINFORCEMENT

A. Install joint reinforcement 16 inches o.c. vertically and as noted below.

B. Place masonry joint reinforcement 8 inches o.c. vertically above and below openings. Extend minimum 16 inches each side of opening.

C. Place joint reinforcement continuous 8 inches o.c. vertically for first 16 inches at top of walls and 8 inches o.c. vertically for first 16 inches at bottom of walls.

D. Place joint reinforcement 8" o.c. vertically for first 16" in over lintels.

E. Lap joint reinforcement end minimum 8 inches. Extend minimum 16 inches each side of openings.

F. Provide reinforcing rods and anchor bolts where indicated, grout solid.

3.08 ANCHORAGES

A. Provide anchors on lintels and beams 24" o.c. horizontally.

B. Provide anchors on columns 16" vertically.

C. Provide anchors attached to roof deck, closure plates and miscellaneous overhead structural elements 32" o.c. horizontally.

D. Secure panel anchors for glass block to wall construction and steel plates on each side every other course - 16 inches o.c. vertically. Weld anchors at 3/8" x 3" steel plates.

3.09 MASONRY FLASHINGS

A. Extend through wall flashings under exterior wythe to 1/2" from exterior face, turn up minimum 8 inches and bed into mortar joint of masonry back-up behind reflective sheathing. Through wall flashing shall rest on exposed lead coated copper flashing.

B. Lap end joints minimum 6 inches and seal watertight, turn up at door and window wall intersections.

C. Provide full height at vertical perimeter of windows and door frames.

D. Exposed Flashing: Provide at all through wall flashing. Provide 4" high vertical leg sloped upward from inside face of exterior wythe across cavity outside face of interior wythe or sheathing. Extend beyond exterior face and bend 1/2" down with 1/2" hem.

3.10 LINTELS

A. Install loose steel lintels over window openings, door openings and other openings.

3.11 CONTROL AND EXPANSION JOINTS

A. Do not continue horizontal joint reinforcement through control joints.

B. Install preformed control joint and expansion joint devices in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

C. Set depth of control and expansion joints in accordance with Section 07900 for sealant performance and as shown on the drawings.

3.12 BUILT-IN WORK

A. As work progresses, build in lintels, anchors, conduit, metal door frames, fabricated metal frames, window frames and other items furnished by other Sections.

B. Build in items plumb and level.

C. Bed anchors of metal door and frames in adjacent mortar joints. Fill frame voids solid with grout.

D. Do not build in organic materials subject to deterioration.

3.13 TOLERANCES

A. Maximum Variation From Unit to Adjacent Unit: 1/32 inch.

B. Maximum Variation From Plane of Wall: 1/4 inch in 10 feet and 1/2 inch in 20 feet or more.

C. Maximum Variation From Plumb: 1/4 inch per story (12'-0") non-cumulative.

D. Maximum Variation From Level Coursing: 1/8 inch in 3 feet and 1/4 inch in 10 feet; 1/2 inch in 30 feet.

E. Maximum Variation of Joint Thickness: 1/8 inch in 3 feet.

F. Maximum Variation From Cross Sectional Thickness of Walls: 1/4 inch.

3.14 CUTTING AND PATCHING

A. Cut and fit for pipes. Coordinate with other Sections of work to provide correct size, shape, and location. Do not proceed until specified sleeves are in place for piping where called for.

B. Obtain Architect's approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.15 CLEANING

A. Clean Work
1. Clean CMU with brush and water. Use cleaner only if necessary.
2. Brick: Wet brick. Clean with commercial masonry cleaner or muriatic acid and brush. Flush with liberal quantities of water. Cover and protect corrosibles and prefinished items.
3. Glass masonry units and structural glazed tile: Clean with water, soft brush, mild detergent and clean cloths.

B. Remove excess mortar and mortar smears.

C. Replace defective mortar. Match adjacent work.

D. Clean soiled surfaces with cleaning solution.

E. Use non-metallic tools in cleaning operations.

3.16 WATER REPELLENT

A. One week or more, prior to application, arrange meeting on the site with manufacturer's representatives, architect and applicator.

B. Apply in accordance with manufacturer's recommendations to all exterior masonry and precast concrete surfaces.

3.17 PROTECTION OF FINISHED WORK

A. Protect finished installation.

B. Without damaging completed work, provide protective boards at exposed external corners which may be damaged by construction activities.

END OF SECTION

DIVISION 5 - METALS

SECTION 05120 - STRUCTURAL STEEL AND STEEL JOISTS

1. GENERAL

1.01 SCOPE

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 specification sections, apply to work specified in this section.

1.02 DESCRIPTION OF WORK

A. The work to be done shall, in general, consist of the following major items; (minor work, work incidental to or arising from other parts of this work may not be listed hereunder but shall be included as may be necessary for the full completion of the job).

Furnishing and erecting, placing or setting of:

1. Columns with baseplates, anchor bolts, beams with bearing plates and anchors.

2. Standard and special connections, including angles, plates, high-strength bolts and expansion bolts.

3. Steel lintels, support angles, plates, bolts, etc., as shown on Structural Drawings and details and all structural members as defined in Section 2, AISC "Code of Standard Practice".

4. Steel joists, joist girders, bridging, connection material, and accessories as required.

5. Welding where required.

6. All shop and field drilling, punching and cutting shown on the drawings and/or specified for architectural, mechanical, electrical and other work.

7. Shop painting, field touch-up and field coat painting.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Section 03300 - Cast-in-place Concrete

B. Section 05500 - Metal Fabrications

C. Section 05120 - Metal Roof Deck

1.04 GENERAL REQUIREMENTS

A. All work of this Section shall be provided in accordance with AISC "Code of Standard Practice for Steel Buildings and Bridges", latest edition, and the Standard Specifications and Code of Standard Practice of the Steel Joist Institute.

B. Erection of structural steel shall be in accordance with the Occupancy, Safety and Health Act, and the Construction Safety Act.

C. Examine all Drawings and data and coordinate the work of this Section with all related and adjoining work.

D. Inspection of structural steel and steel joists will be conducted by an independent testing laboratory.

1.05 SUBMITTALS

A. Shop drawing submittals shall be in accordance with Section 01300, Submittals

B. Submit for review prior to fabrication or purchase, drawings showing the kind of material, sizes of members, details or pieces worked out with due reference to their position, framing, openings, method of securing same together, erection plans, anchor bolt plans, and proper execution of the work in connection with other trades.

C. Where the required data for attaching materials to structural steel is not shown on design drawings, Contractor shall obtain information from the Engineer before submitting shop drawings.

D. Review of shop drawings will be for sizes and shapes of main and secondary members only.

E. Review of shop drawings will not cover detailed fabricating dimensions. Any errors in dimensions on shop drawings are the responsibility of the Contractor.

F. Submit calculations for steel joists and joist girders, prepared by a registered professional engineer.

F. Submit mill test reports and shipping documents if requested by the Owner.

G. Submit for review, qualifications of welders performing shop and field welding.

2. PRODUCTS

2.01 MATERIALS

A. Structural Steel shall conform to ASTM A36.

B. All bolts shall conform to ASTM A325 unless noted otherwise on the Drawings.

1. Bolts for steel connections shall be of lengths required, with smooth or ribbed surfaces the full length of the grip. Unfinished bolts shall be fitted with self-locking nuts or with lock washers and plain nuts.

2. High strength bolts, including nuts and washers, shall comply with ASTM A325. These bolts shall be identified by markings on top of the bolt head. Minimum dimensions for bolts, washers, bevelling, etc., shall comply with the requirements of the "Specifications for Structural Joints Using ASTM A325 Bolts"as issued by Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation.

C. Expansion bolts shall be wedge-type with one piece wrap around expansion clip meeting the requirements of Federal Specification QQ-Z-325C, Group II, Type 4, Class 1 and shall be zinc plated. Expansion bolts shall be installed in drilled holes in accordance with manufacturer's instructions.

D. Arc welding electrodes shall conform to ASTM Standard Specifications A233. Electrodes shall be of proper classification numbers.

E. Shop coat of paint shall be zinc chromate conforming to Primer specifications as listed in Steel Structures Painting Council Paint System Specification.

G. Steel joists and joist girders shall conform to the Standard Specifications of the Steel Joist Institute. Bearing, anchorage, bridging,and bracing shall be in conformance with SJI requirements.

3. EXECUTION

3.01 FABRICATION

A. All shop fabrication shall conform to Section 1.23, AISC Specifications. All members shall be free of twists, kinks, buckles, or open joints. Shearing and punching shall be without ragged or torn edges. Holes shall be enlarged only by reaming.

B. All shop connections shall be welded except where otherwise noted.

C. All welding, shop and field, shall be performed only by procedures and welders qualified in accordance with standards for workmanship of American Welding Society "Code for Arc and Gas Welding in Building Construction", as amended to date.

D. No welding shall be done when the temperature is less than 15 degrees F. At temperatures below 35 degrees F. heat area within 3 inches of weld at temperature warm to the hand.

E. Omit shop coat of paint from areas required to be field welded. After erection touch up field connections and welds with same paint as for shop coat.

F. Erection marks shall be painted on shop painted surfaces.

3.02 ERECTION

A. Erection of steel shall be done in conformance with Section 7 of AISC "Code of Standard Practice".

1. All structural framing shall be accurately set and secured in position.

2. All structural steel work shall be maintained in its position with adequate bracing and guying until all permanent field connections are completed.

B. All field connections shall be bolted with high strength bolts or welded where specifically indicated on the drawings.

1. High tensile bolts shall be installed with hardened washers. Nuts shall be tightened by one of the methods described in Subsections 8(d)(1) through 8(d)(4) of the RCSC Specifications for Structural Joints using ASTM A325 or A490 Bolts.

C. Provide anchor bolts for column base plates. Bolts shall be installed as detailed on drawings.

D. Make field changes for improper fit only after Engineer's approval. Gas torch cutting will not be permitted.

3.04 FIELD PAINTING

A. Touch-up and spot paint all field bolts, welds and other surfaces where the paint has been rubbed off during the installation with same paint as shop coats, but of different tint or color.

3.05 INSPECTION AND TESTS

A. Quality control of all shop and field work shall be maintained by the Contractor.

B. Testing and inspection of structural steel shall be done by a testing agency selected by the Contractor and approved by the Owner. The Contractor will be reimbursed for the actual cost of testing plus markups. The testing agency shall have access to all

of the Contractor's quality control data. The Contractor shall supply the testing agency with the following:

1. A complete set of approved erection drawings and shop drawings.

2. A complete set of engineer's structural drawings and specifications.

C. The quality control expected of the Contractor includes inspection of all members for straightness, absence of laminations, etc., testing of bolted or welded shop and field work.

1. High-strength bolts shall be tested in accordance with the Research Council Specifications for A-325 Bolts. At least one bolt in every connection should be tested. Should any bolt in one connection not test satisfactorily, all bolts in that connection shall be tested.

D. In the event that inspections reveal welds or bolts to be undersized, loose or defective, the cost of testing and retesting shall be at the Contractor's expense.

E. Material and workmanship not in conformity with the provision of the specifications will be rejected and remedied by the Contractor, at any time defects are found.

END OF SECTION

DIVISION 5 - METALS

SECTION 05300 - METAL ROOF DECK

1. GENERAL

1.01 SCOPE

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification sections, apply to work specified in this section.

1.02 DESCRIPTION OF WORK

A. The work to be done shall, in general, consist of the following major items: (minor work, work incidental to or arising from other parts of this work may not be listed hereunder but shall be included as may be necessary for the full completion of the job).

Furnishing and installing:

1. Metal roof decking.

2. Permanent metal forms over recessed exterior doors.

3. Closures, roof drain sump pans, and other accessories necessary to complete the work of this Section.

B. Work under this section is affected by a Bid Alternate A. See Fixed Price Proposal Form.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Section 05120 - Structural Steel and Steel Joists

B. Section 07215 - Rigid Roof Insulation

1.04 GENERAL REQUIREMENTS

A. Metal deck shall be manufactured in accordance with the latest specifications of the Steel Deck Institute and shall be as manufactured by United Steel Deck, South Plainfield, NJ; Epic Metals Corporation,

Rankin, PA; or Wheeling Corrugating Co., Wheeling, WV.

B. The deck manufacturer shall be a member of the S.D.I. and the design for the decking used on this project shall conform to the latest S.D.I. recommendations.

C. The latest A.I.S.I. "Specification for the Design of Cold Formed Steel Structural Members" shall govern the design of the floor and roof deck.

1.05 SUBMITTALS

A. Shop drawing and sample submittals shall be in accordance with Section 01300, Submittals.

B. Shop drawings shall show layout of sheets, material specifications, typical details, welding and fastening requirements, instructions to erectors and other details as required.

2. PRODUCTS

2.01 MATERIALS

A. All deck shall be of the depth and gages indicated on the drawings. 1 1/2" decking shall be continuous across a minimum of three spans. Roof deck shall be furnished with a heavy coat of rust inhibitive paint bonderized to metal at 350 degrees F after fabrication.

B. Provide all miscellaneous hardware, deck closures, edge strips, and miscellaneous fasteners as required.

C. Provide 14 gage, 30" square galvanized reinforcing plates at each roof drain. Opening to be field cu to suit drain dimensions.

3. EXECUTION

3.01 ERECTION

A. Metal deck shall be unloaded, stripped, and ha with proper equipment so as not to damage metal Damaged will be replaced, if requested by the

Engineer at the Contractor's expense.

B. The deck shall be placed on the supporting steel and adjusted to final position before being permanently fastened.

C. The deck units shall be fastened to the supporting steel with puddle welds of diameter and spacing recommended by the deck manufacturer. Side lap attachments shall be in accordance with S.D.I. requirements.

D. All welding is to be performed by competent welders.

E. Touch-up all areas where paint or galvanizing is damaged. Roof deck shall be touched-up with deck manufacturer's standard paint.

END OF SECTION

DIVISION 5 - METALS

SECTION 05500 - METAL FABRICATIONS

1. GENERAL

1.01 SCOPE

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification sections, apply to work specified in this Section.

B. Work by this Section includes, but is not limited to:
1. Miscellaneous Angle Framing.
2. Tubular Railings and cast in pipe sleeves.
3. Interior Metal Stairs.
4. Abrasive Nosings.
5. Steel Channel and Tube Frames.
6. Bollards.
7. Counter Supports (Sink Carriers).
8. Expansion Joint Covers.
9. Lintels.
10. Insulated Metal Panel.
11. Angle Frame at Insulated Metal Panel.
12. Soffit closure plates.
13. Wall closure plates.
14. Glass block receptor channel and anchor plates.
15. Closure plates at skylight at mechanical roof penetrations.

1.02 RELATED WORK

A. Section 03300: Cast in Place Concrete

B. Section 04200: Unit Masonry

C. Section 09900: Painting

1.03 STRUCTURAL REQUIREMENTS

A. Railing assembly, wall rails, and attachments to resist force in any direction of 200 pounds at any point without damage or permanent set.

1.04 REFERENCES

A. ASTM A36 - Structural Steel.

B. ASTM A386 - Zinc-coating (hot dipped on assembled steel products).

C. ASTM A501 - Hot Formed, Welded, and Seamless Carbon Steel Structured Tubing.

D. AWS - D1.1 - Structural Welding Code.

E. FSTT-P-31 - Paint, Oil; Iron Oxide, Ready Mix Red.

F. FSTT-P-645 - Primer, Paint, Zinc Chormate, Alkyd Type.

1.05 SUBMITTALS

A. Submit shop drawings and product data in accordance with section 01300, Submittals.

B. Indicate component details, materials, finishes, connection and joining methods and relationship to adjoining work.

C. Indicate profiles, sizes, connection attachments, reinforcing anchorage, openings, size, and size of fasteners and accessories.

D. Indicate welding connections using standard AWS welding symbols.

2. PRODUCTS

2.01 MATERIALS

A. Steel Sections: ASTM A36

B. Sheet Metal: ASTM A446

C. Bolts, Nuts, and Washers

D. Welding Materials: AWS D1.1 type required for materials being welded.

E. Primer: FSTT-P-31 - Red or brown for shop application and field touch up.

F. Exposed Mechanical Fasteners: Flush countersunk screws or bolts unobtrusively located.

2.02 FABRICATION - GENERAL

A. Verify dimensions on site prior to shop fabrication.

B. Fabricate items with joints tightly fitted and secured.

C. Fit and shop assemble sections in largest practical sizes, for handling through building openings.

D. Grind exposed welds flush and smooth with adjacent finished surface. Ease exposed edges to small uniform radius. At exposed to view locations place plastic filler between welds; sand flush.

E. Accurately form components required for anchorage of railings to stair and wall construction.

F. Hot dip galvanize all products including items built into exterior wall construction after fabrication. Conform to the requirements of ASTM A386, 2.0 oz. per square foot. Items which are too large to galvanize after fabrication shall be assembled in largest components to permit hot dip galvanizing and joined after galvanizing. Clean and coat all welds and touch up all abrasions with "ZRC".

G. Prepare ferrous items for priming as follows:
   1. Remove obvious deposits of grease and oil first.
   2. Remove loose mill scale, loose black oxide, all rust, all welding flux and spatter, and other contaminents by grinding and wire brushing. Do not roughen or burnish metal.
   3. Clean entire surface by flooding with clean mineral spirits and wiping dry with clean cloths.

H. Apply primer in thickness recommended by manufacturer. Do not overthin. Avoid runs, sags, and holidays. Brush primer into cracks and joints.
   1. Allow primer to dry completely before handling or shipping.

3. EXECUTION

3.01 SCHEDULE

A. Angle Framing:
   1. Miscellaneous brackets, supports, anchors, and frames for mechanical and electrical equipment are specified in Divisions 15 and 16.
   2. Provide miscellaneous brackets, supports, anchors, and frames other than for mechanical and electrical equipment.
   3. Furnish anchors for ledgers and other metal products to be attached to masonry or concrete.

B. Tubular Steel Railings: Provide steel railings as indicated. Railings shall be nominal 1-1/2" outside diameter actual diameter 1.9". Railings shall be constructed of standard weight pipe. Provide posts, railings, pipe sleeves, flanges, cover plates, sub-framing, plates, anchors, wall brackets, and other accessories and appurtenances required for a complete installation. Construct tubular steel sections as shown. Tee and cross connections shall be mitered and/or coped, and joined by continuous fillet welds ground flush and smooth. Make splices in concealed locations where practicable, with splice pieces of bar stock secured inside the section, and with flathead countersunk screws through the bottom of the railing. Joints shall be flush and tight between sections. Bend units carefully to required shapes without crimping or otherwise damaging sections. Wall rails shall be returned to wall and capped. Ease and round all exposed sharp edges. Paint. Sleeves cast in concrete for removable railings shall be black polypropylene Schedule 80 with inside diameter of 1.939". Embed sleeves 8" in concrete, set top of sleeve 1/2" above finished concrete floor. Modify rails for removable snug fit. Provide 1/4" thick 4" high kick plate at all railings without concrete curbing.

C. Interior open grating stairs and landings: Stair construction shall be complete with all necessary struts, tubes, angles, stringers, bolts, anchors and other accessories and shall be designed to sustain a live load of not less than 100 p.s.f. and concentrated load of 300 pounds at any point. All members shall be securely welded together in accordance with industry standards, exposed and visible welds shall be ground smooth. Treads shall be constructed of welded steel serrated grating with minimum 1-1/4" x 3/16" bearing bars spaced 1-3/16" on center and cross bars at 4" on center. Treads shall have 2-1/2" x 3/16" x depth of tread end panels and a 2-1/4" x 1-1/8" bent checker plate nosing. Landings and platforms shall be constructed of serrated welded grating matching the treads. Support perimeter with angles and provide supplementary angles or tees to meet design load specifications as required below grating. Platform and landing gratings may be provided with deeper bearing bars to meet design load capacity in lieu of supplementary angles or tees. Form stringers of rolled steel channels.

D. Abrasive Nosings for Interior Cast-In-Place Concrete Stairs: Provide abrasive cast-in-nosings for all cast-in-place concrete steps meeting the following specifications:
   1. Nosings shall be 1-1/2" x 1-1/2" x 3/8" thick by the width of the tread less two inches, cast iron with abrasive surface and concrete anchors: equal to:
      a. Curb Bar CB 2 by American Abrasive Metal Co.

E. Structural Steel Channel Tube Door and Overhead Door Frames: Construct frames of shapes indicated on drawings, miter corners and weld, grind all welds smooth and flush. Weld masonry ties to back of frames to fit in courses with reinforcing both wythes. Hop dip galvanize. Paint all frames, interior and exterior.

F. Exterior Bollards: Fabricate bollards of double extra strong steel pipe, nominal diameter 8". Top of bollards to align with next masonry joint above 4'-0" above finish grade. Set bollard in concrete in 18" diameter hole 4'-0" deep. Form in shapes shown on drawings. Hot dip galvanize after fabrication. Paint. Fill single vertical bollards with concrete and provide domed top.

G. Interior Bollards: Fabricate bollards of double extra strong steel pipe, nominal diameter 6". Weld 8" x 8" x 3/4" steel plate to bottom. Anchor to concrete floors with four 3/4" cast-in-place anchor bolts. Bollards to be 4'-0". Fill pipe with concrete, form smooth, dome-shaped top. Hop dip galvanize after fabrication. Paint.

H. Loading Dock Curb Angles: See Structural Drawings and Section 11161.

I. Expansion Joint Cover (wall): 1/4" steel 8" wide. Provide full width of each opening. Center over joint. Secure to one side of joint only with countersunk 1/4" expansion bolts in sleeves 12" o.c. Paint.

J. Lintels: Hot dip galvanize and prime paint.

L. Insulated Metal Panel and Angle Frame: Provide 4 sided angle frame made of 2 x 2 x 1/8" angle with mitered and fully welded corners. Hot dip galvanize after fabrication. Provide 2" thick insulated metal panel.
Face sheet: 24 ga. galvanized steel.
Stabilizer: 1/8" thick mineral fiber board.
Core: 1-3/4" thick non combustible insulation.
Stabilizer: 1/8" thick mineral fiber board.
Back Sheet: Same as face.
Return all four sides of face and back sheet, fit back sheet into face with stabilizer boards and insulation between. Provide bead of sealant between overlapping edges and secure with stainless steel screws 12" o.c. Overlap shall be full depth. Paint before installation.

M. Soffit Closure Plates: Fabricate soffit closure plates from 14 gauge galvanized sheet steel. Fabricate into nesting pans. Panels shall be 4'-0" wide by depth shown. Panels shall be set symmetrical to match precast concrete sill below. Provide smaller equal panels at each end of each bay. Fasten panels to structure and blocking with flat head screws 12" o.c. notch at all structural members. Paint.

N. Wall Closure Plates: Provide 14 gauge galvanized sheet metal closure plates between the top of the concrete column encasement and the CMU piers. Fasten with minimum two screws.

O. Provide bent metal glass block receptor channel and anchor plate: Fabricate glass block receptor channel of 14 gauge galvanized sheet steel. Attach to structure above 12" o.c. Provide for expansion and contraction with slotted holes. Fabricate in two or three pieces of equal length per bay. Provide 1/4" separation and connect with cover channel to form control joint. Provide 3/8" x 3" vertical anchor plates where indicated in glass block construction. Anchor to structure above and precast concrete sill below. Hop dip galvanize.

P. Closure plates at roof deck for skylights and mechanical penetrations: Provide 14 gauge galvanized sheet metal closure angles continuously around four sides of all roof penetrations at inside of metal deck. Closures shall be bent to form 6" x 6" angle.

Q. Vanity Bracing: Provide continuous 3 x 3 x 1/4" steel angle at front of vanity counter top. Provide plumbing fixture carrier: 1 pair floor mounted concealed arms equal to Josam 17100 with 22" arms. Build carrier verticals within wall construction.

3.02 ERECTION

A. Erect all items level and plumb, free from distortion or defects detrimental to appearance or performance.

B. Provide anchors, plates, angles, hangers, and struts required for connecting to structure.

C. Verify alignment with adjacent construction. Coordinate related work.

D. Do not field cut or alter members.

E. Field bolt and weld to match standard of shop bolting and welding. Hide bolts and screws whenever possible. Where not hidden, use flush countersunk fastenings.

F. Mechanically fasten joints butted tight, flush, and hairline. Grind welds smooth and flush. Touch up field weld with primer.

G. Remove all erection markings and notations.

END OF SECTION

DIVISION 6 - WOOD AND PLASTICS

SECTION 06001 - ROUGH CARPENTRY

1. GENERAL

1.01 SCOPE

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification sections, apply to work specified in this Section.

B. Work by this Section includes, but is not limited to:
   1. Perimeter roof blocking.
   2. Fan, mechanical unit, skylight and roof hatch curbs.
   3. Miscellaneous furring and blocking.

1.02 RELATED WORK

A. Section 07215 - Rigid Roof Insulation

B. Section 07532 - Fully Adhered Single Membrane Roofing System

1.03 QUALITY ASSURANCE

A. Lumber Grading Rules and Wood Species to be in conformance with PS 20.

B. Grading rules of the following associations apply to materials furnished under this Section:
   1. West Coast Lumber Inspection Bureau (WCLIB).
   2. Western Wood Products Association (WWPA).
   3. Northern Hardwood and Pine Manufacturer's Association (NHPMA).

C. Grade Marks
   1. Identify lumber and plywood by official grade mark.
   2. Lumber
      a. Grade stamp to contain symbol of grading agency certified by Board of Review, American Lumber Standards Committee, mill number or name, grade of lumber, species or species grouping or combination designation, rules under which graded where applicable, and condition of seasoning at time of manufacture.
      b. S-GRN: Unseasoned.
      c. S-DRY: Maximum 19% moisture content.
      d. MC-15: Maximum of 15% moisture content.

1.04 SUBMITTALS

A. Submit certifications in accordance with Section 01300.

B. Certification
   1. Pressure treated wood: Submit certification by treating plant stating chemicals and process used, net amount of salts retained, and conformance with applicable standards.
   2. Preservative treated wood: Submit certification for water-borne preservative that moisture content was reduced to 19% maximum, after treatment.

1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Immediately upon delivery to job site, place materials in area protected from weather.

B. Store materials a minimum of 6 inches above ground on framework or blocking and cover with protective waterproof covering providing for adequate air circulation or ventilation.

C. Do not store seasoned materials in wet or damp portions of building.

D. Protect fire-retardant materials against high humidity and moisture during storage and erection.

2. PRODUCTS

2.01 MATERIALS

A. Lumber:
   1. Dimensions
      a. Specified lumber dimensions are nominal.
      b. Actual dimensions to conform to PS 20.
   2. Surfacing: Surface four sides (S4S), unless specified otherwise.
   3. End jointed lumber
      a. Structural purposes interchangeable with solid sawn lumber.
      b. Glued joints of loadbearing lumber: PS 56.
   4. Framing lumber, any commercial softwood species
      a. Light framing
         1) Plates, blocking, bracing, furring and nailers: Utility grade. Blocking and nailers for membrane roofing shall be #2 Hem-Fir or better.

C. Preservative Treated Wood Products
   1. Factory Preservatives: Water-Borne salt preservatives for plywood, blocking, cants and nailers for roof and gravel stop installed: Preservative must be approved by roof membrane manufacturer.
      a. AWPB LP-2, above ground application.
      b. Lumber redried to maximum moisture content of 19%, stamped "DRY".
   2. Site applied preservatives for blocking, cants, and nailers for roof and gravel stop construction: Approved by roof membrane manufacturers.
   3. Untreated Lumber: All heartwood grades. Heartwood grades of Western Red Cedar or Red Wood can be used in lieu of treated lumber for roof cants and roof blocking.
   4. Blocking and nailers for membrane roof shall be treated with preservative approved by roof membrane manufacturer.

D. Rough Hardware
   1. Expansion shields: FS FF-B-561.
   2. Lag screws and bolts: FS FF-B-561.
   3. Toggle bolts: FS FF-B-588.
   4. Wood screws: FS FF-S-111.
   5. Nails and staples: FS FF-N-105.

3. EXECUTION

3.01 INSPECTION

A. Verify that surfaces to receive carpentry materials are prepared to required grades and dimensions.

3.02 INSTALLATION

A. Blocking:
   1. Wedge, align, and anchor blocking with countersunk bolts, washers and nuts or nails.
   2. Locate blocking to facilitate installation of finishing materials and speciality items.

B. Pressure-Treated Wood Products:
   1. Provide preservative pressure treated or dipped wood for exterior blocking, furring, nailing strips in conjunction with gravel stops, roofing and flashing. Heartwood grades of Western Red Cedar or Redwood can be used in lieu of treated lumber. Requirements for treatment of nailers and blocking specified Section 07531.
   2. Apply two brush coats of same preservative used in original treatment to all sawed or cut surfaces of treated lumber.

END OF SECTION

DIVISION 6 - WOOD AND PLASTICS

SECTION 06200 - FINISH CARPENTRY

1. GENERAL

1.01 SCOPE

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification sections, apply to work specified in this Section.

B. Work by this Section includes, but is not limited to:
   1. Millwork: Plastic laminate covered vanities.

1.02 RELATED WORK

A. Section 05500: Metal Fabrications.

B. Section 06001: Rough Carpentry.

1.03 SUBMITTALS

A. Submit shop drawings and samples in accordance with Section 01300, Submittals.

B. Shop Drawings:
   1. Submit shop drawings in accordance with Contract Conditions for all millwork, identified with location, and type of finish.
   2. Show millwork in related and dimensional position with sections either full size or 3 inches equal 1 foot scale.
   3. The mill shall be responsible for details and dimensions not controlled by job conditions.
   4. Show all required field measurements beyond control of the mill.

C. Samples:
   1. Submit complete sample of color duplicates of plastic laminate (Manufacturer's complete color chain).

1.04 DELIVERY

A. Deliver, store and handle wood cabinets in manner to prevent damage and deterioration.

B. Defer delivery to the job until the installation and storage areas are complete and dry of all wet-type construction.

C. Maintain relative humidity in storage areas not to exceed 55%.

D. Protect all cabinet surfaces subject to damage while in transit.

2. PRODUCTS

2.01 QUALITY GRADE

A. General: Materials and Fabrication - Custom grade in accordance with Quality Standards Illustrated of the Architectural Woodwork Institute, 1978 edition, conforming to the following Sections:
1. Section 100 - Solid Wood Members
2. Section 200 - Plywood and Particleboard
3. Section 400 - Casework

B. Schedule of Finishes:
1. Counter tops: Post formed plastic laminate.
2. Back splashes and aprons: Post formed plastic laminate.

2.02 MATERIALS

A. Solid wood for concealed members: at option of mill.

B. Concealed Plywood: At option of mill.

C. Particle Board: High density.

D. Adhesive: Type 11, CS 35-61.

E. Plastic Laminate: High pressure plastic laminate - Colors and surface textures to be selected by the Architect from manufacturer's full line. All plastic laminate to be post formed to follow contour of wood and trim shown on drawings.
1. Plastic laminate surface:
   a. Acceptable manufacturers:
      1) Nevamar
      2) Formica
      3) Wilsonart
      4) Laminart
2. Backing Sheets:
   a. Acceptable manufacturers:
      1) Nevamar
      2) Formica
      3) Wilsonart
      4) Laminart
   b. Quality: Formica Grade 91.
3. Adhesive: As recommended by manufacturer.

2.03 FABRICATION

A. Fabrications Workmanship: Comply with Section 400 - Casework - of the reference standard and details as shown on drawings.

3. EXECUTION

3.01 CONDITION OF SURFACES

A. Examine all grounds, stripping, furring and blocking to secure work.

B. Do not install until all defects are corrected.

3.02 INSTALLATION

A. Install millwork plumb and level without distortion.

B. Shim as necessary with concealed shims.

C. Accurately scribe and closely fit all face plates, filler strips and trim strips to irregularities of adjacent surface.

D. Supply plastic laminate in longest possible sheets. Show all jointing on shop drawings.

E. Provide backing sheet on back of all materials having plastic laminate.

3.03 PLASTIC LAMINATE

A. Install materials according to manufacturer's recommendations.

B. Pieces shall be as large as possible, minimum number of joints, equal size pieces where possible.

C. Show joints on shop drawings.

END OF SECTION

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

SECTION 07160 - BITUMINOUS DAMPPROOFING

1. GENERAL

1.01 SCOPE

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification sections, apply to work specified in this Section.

B. Work of this Section includes but is not limited to:
1. Cold applied dampproofing on masonry walls.

1.02 RELATED WORK

A. Section 04200 - Unit Masonry

B. Section 07212 - Board Insulation

1.03 REFERENCES

A. ASTM D1227, Type IV.

1.04 SUBMITTALS

A. Submit product data in accordance with Section 01300, Submittals.

B. Indicate properties of primer, bitumen, and mastic.

C. Submit manufacturer's installation instructions.

1.05 ENVIRONMENTAL REQUIREMENTS

A. Maintain ambient and surface temperatures above 40 degrees F for 24 hours before application, and continuously until dampproofing has cured.

2. PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Karnak - 920 fibrated non-asbestos, non-pollutant, non-volatile bituminous

3. EXECUTION

3.01 INSPECTION

A. Verify surfaces are solid, free of frozen matter, loose particles, cracks, pits, rough projections, and foreign matter detrimental to adhesion and application of dampproofing.

B. Do not apply dampproofing to damp, frozen, dirty, dusty surfaces unacceptable to applicator.

C. Verify items which penetrate surfaces to receive dampproofing are securely installed.

D. Beginning of installation means acceptance of substrate.

3.02 PREPARATION

A. Clean and prepare surfaces to receive dampproofing in accordance with manufacturer's instructions.

B. Apply mastic to seal penetrations, small cracks in substrate.

3.03 APPLICATION

A. Prime surfaces in accordance with manufacturer's instructions.

B. Apply bitumen with trowel.

C. Apply one coat, continuous and uniform at a rate of 5-6 gal/100 sq. ft.

D. Apply on exterior face of interior wythe of masonry cavity walls.

E. Seal watertight, items projecting through dampproofing surface with mastic.

END OF SECTION

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

SECTION 07213 - FIBROUS AND RIGID INSULATION FOR WALLS AND SLABS

1. GENERAL

1.01 SCOPE

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to work specified in this Section.

B. Work by this Section includes but is not limited to:
1. Fire safing and fire proofing insulation systems.
2. Perimeter insulation.
3. Cavity wall insulation.

1.02 RELATED WORK

A. Section 04200 - Masonry

B. Section 07160 - Dampproofing

C. Section 07215 - Rigid Roof Insulation.

D. Section 07900 - Sealants

1.03 QUALITY ASSURANCE

A. Provide manufacturer's written certification that products intended for use meet specified requirements.

B. Testing: Fire Safing Flame Spread: ASTM E84-85, flame spread of 25 or less, fuel contributed 15 or less, and smoke contributed 20 or less.

C. Testing: Fibrous Thermal Insulation: ASTM E84-85, flame spread of 25 or less, smoke developed 50 or less.

D. Testing: Rigid insulation for masonry cavity wall: ASTM E84, Flame Spread of 5 and Smoke Developed of 145-175.

1.04 NON-COMBUSTIBLE TEST

A. ASTM E136.

1.05 SUBMITTALS

A. Submit manufacturer's product data in accordance with Section 01300, Submittals.

1.06 PRODUCT DELIVERY AND STORAGE

A. Deliver materials to the project site in manufacturer's original packaging.

B. Store off ground, protect against weather and condensation.

C. Immediately remove damaged material from the site.

1.07 COORDINATION

A. Coordinate installation with other trades whose work may be affected or have an effect.

2. PRODUCTS

2.01 INSULATION SYSTEMS

A. Safing: ASTM C665, Type 1, HH-I-558B, Classes 1 and 2, non-combustible, ASTM E136. ThermaFiber Fire Safing Insulation manufactured by United States Gypsum Co.

B. Masonry cavity wall construction
   1. Polyisocyanurate foam foil faced both sides, reflective one face, equal to Celotex Thermax.
   2. Thickness: 1-1/2 inches
   3. R Value: 12
   4. Maximum Flame Spread: Core 20, aluminum face 15, foil back 20.
   5. Smoke Developed: Core 105-170, aluminum face 65, foil back 120-200.
   6. Federal Specifications: HH-I-1972/1, Class 2.

C. Perimeter Insulation
   1. Extruded polystyrene
   2. Thickness: 3 inches
   3. R Value: Minimum 15
   4. Compressive Strength: 25 psi
   5. Flame Spread: 5
   6. Smoked Developed: 45-175

3. EXECUTION

3.01 INSPECTION

A. Examine areas scheduled to receive insulation to insure protection against inclement weather and other hazards, and to insure Work of preceeding trades is completed.

3.02 INSTALLATION

A. Safing Insulation: Install in all openings in partitions and in all fire-rated partitions, around pipes, conduits, ducts, etc. Fill voids between partition top and structural deck, and between top of wall construction and bottom of beams, full thickness of wall construction for all walls. Install according to manufacturer's recommendations. Coordinate fire safing installation with fire barrier - sealant installation Section 07900.

B. Masonry Cavity Wall Insulation: Place insulation tight against outer face of inner wythe of masonry. Secure in place between wall reinforcing and between anchors. Place with reflective surface facing air space in cavity, toward building exterior. Fit insulation around anchors and into reinforcing. Align to maintain full clear cavity, secure in place.

C. Perimeter Insulation: At perimeter walls from footing to floor construction above and two feet horizontally under edge of floor slab, install 3" thick insulation as indicated on Drawings. Butt edges tight and temporarily secure in place.

3.03 CLEAN UP

A. Remove and dispose of excess materials, litter and debris, leaving work areas in clean condition.

END OF SECTION

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

SECTION 07215 - RIGID ROOF INSULATION

1. GENERAL

1.01 SCOPE

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to work specified in this Section.

B. Work by this Section includes but is not limited to:
1. Roof insulation and installation on new metal structural decks.

1.02 RELATED WORK SPECIFIED ELSEWHERE:

A. Fully Adhered Single Membrane Roofing System: Section 07532

1.03 REQUIREMENTS OF REGULATORY AGENCIES

A. Install rigid insulation to meet requirements of "Factory Mutual Laboratories Class 1, Construction", I-90 uplift.

1.04 SUBMITTALS

A. Submittals shall be in accordance with Section 01300, Submittals.

B. Samples: One 6 in. x 6 in. piece rigid insulation.

C. Manufacturer's Literature: Manufacturer's recommended installation instructions.

1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to project site in manufacturer's original unopened packaging.

B. Identify contents, manufacturer brand name, thermal values, and applicable standards.

C. Storage of materials within structure is not permitted. Store materials in area protected from weather, moisture and open flame or sparks, and protect materials from open flames and sparks during installation.

D. When stored outdoors, insulation should be stacked on pallets at least 4 inches above ground level and covered with tented tarpaulins. Plastic is not acceptable. Tarpaulin must be vented to prevent condensation.

E. Remove damaged materials from the site.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Do not install insulation during rain or wet weather or when surfaces are wet.

B. This insulation is part of the total roofing system including fully adhered single membrane. No part of this system shall be installed unless the complete system for a given area can be completed in the same day. See requirements of Section 07532.

C. Materials subjected to moisture will be rejected.

2. PRODUCTS

2.01 RIGID INSULATION

A. Acceptable Manufacturers: Insulation and membrane materials must be provided by or approved by membrane manufacturer for installation on this specific project.
   1. Specifications and detail drawings for fully adhered single membrane system have been based on Sarnafil US Inc.

B. On Metal Deck Substrate
   1. Rigid insulation, SarnaTherm insulation or equal insulation approved by Sarnafil
      a. Polyisocyanurate roof insulation
      b. Thickness: 3.0 inches
      c. R Value: 20 plus or minus
      d. F.M. Class 1 approved 1-90 uplift
      e. Facings: Fiberous Matt
      f. Flame Spread: 25 per ASTM E-84
      g. Foam Core Density: 2 pounds per cubic foot
      h. Compressive Strength: 25 psi
      i. Moisture Vapor Transmission: 1.0 PERM per inch
   2. Mechanical Fasteners
      a. Sarnafastener plates and screws at metal deck
      b. Uplift 1-90

2.02 TAPERED INSULATION AT DRAIN SUMPS, PERIMETER AND WHERE INDICATED ON DRAWINGS

A. Tapered SarnaTherm insulation or equal approved by Sarnafil.

B. Slope: 1" per foot.

3. EXECUTION

3.01 INSPECTION

A. Examine area to receive rigid insulation: Notify Architect of unsound areas.

B. Check surfaces to receive rigid insulation to assure they are in uniform plane, free of debris, oil, grease, and other items detrimental to installation.

C. Proceed with application of insulation only when conditions are satisfactory to complete the entire roofing system in one area.

3.02 INSTALLATION

A. Mechanical Fastening Roof Insulation to Metal Deck
1. Install in accordance with manufacturer's specifications and as specified below:
2. Install insulation on metal deck with edges parallel to flutes and bearing on deck surface.
3. Stagger end joints for each course.
4. Cut and fit insulation where roof deck meets vertical surfaces, hold from vertical flashings 1/4 inch. Miter edges at ridges and elsewhere to prevent open joints or irregular surfaces.
5. Butt edges to form moderate contact but not deformed.
6. Cut panels as close to walls as possible.
7. Attach insulation to metal deck using mechanical fasteners. Spacing and quality to meet manufacturer's recommendations and meet or exceed F.M. I-90# uplift resistance. Contractor shall make visual check for electrical conduit installations which may create problems - locate fasteners to void conduit penetration.
8. Provide tapered insulation at all drains and at roof perimeter. Insulation at drains shall taper from 1" thick at drains to 3" thickness in field of roof.

END OF SECTION

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

SECTION 07532 - FULLY ADHERED SINGLE MEMBRANE ROOFING SYSTEM (SARNAFIL)

1. GENERAL

1.01 SCOPE

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to work specified in this Section.

B. Work by this Section includes but is not limited to:
   1. Scope: Provide fully adhered Sarnafil roofing membrane with flashings, and other items to comprise a complete roofing system.

C. Work included: The work includes but is not limited to:
   1. Roof membrane
   2. Roof membrane flashings
   3. Walkways
   4. Sealants and adhesives
   5. Base Sheet
   6. Fasteners
   7. Warning sign

D. Related Work:
   1. Section 07215 - Rigid Roof Insulation
   2. Section 07600 - Flashing and Sheet Metal
   3. Section 07724 - Roof Hatch
   4. Section 07810 - Plastic Skylights

E. Upon successful completion of work the following warranties shall be provided:
   1. Sarnafil's warranty
   2. Roofing contractor's warranty

1.02 QUALITY ASSURANCE

A. No substitutions.

B. This roofing system shall be applied only by a contractor authorized by Sarnafil prior to bid.

C. Upon completion of the installation, and the delivery to Sarnafil by the contractor of a certification that all work has been done in strict accordance with the contract specifications and Sarnafil's requirements, an inspection shall be made by a representative of Sarnafil to observe the roofing system.

D. There shall be no deviation made from the contract specification or the approved shop drawings without prior written approval by the owner, the Architect, and Sarnafil.

E. All work shall be completed by personnel trained and authorized by Sarnafil.

1.03 SUBMITTALS

A. Provide product data, shop drawings, samples, documents and certifications in accordance with Section 01300, Submittals.

B. The roofing contractor shall submit the following:
   1. Samples of each material to be used in the roof system including each component manufacturer's literature.
   2. Written approval by the insulation manufacturer (as applicable) for use and performance of the product in the proposed system.
   3. Specimen copy of Sarnafil's warranty.
   4. Specimen copy of contractor's warranty.
   5. Dimensioned shop drawings, which shall include:
      a. Outline of roof and roof size.
      b. Profile details of flashing methods for penetrations and terminations.
      c. Technical acceptance from Sarnafil.
   6. Certifications by producers of roofing and insulating materials that all materials supplied comply with all requirements of the identified ASTM and industry standards.
   7. Certification that the system specified meets all identified code and insurance requirements.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. All products delivered to the job site shall be in the original unopened containers or wrappings.

B. Handle all materials to prevent damage.

C. Membrane rolls shall be stored lying down on pallets, and fully protected from moisture.

D. Bonding adhesives shall be stored at temperatures above 40 deg. F.

E. All flammable materials shall be stored in a cool, dry area away from sparks and open flames. Follow precautions outlined on container or supplied by material manufacturer and supplier.

F. Any materials that are determined by the owner's representative to be damaged are to be removed from the job site and replaced at no cost to the owner.

1.05 JOB CONDITIONS

A. Sarnafil materials may be installed under various temperature conditions but only after consultation with Sarnafil, as performance of Sarnafil materials, as well as installation costs and production, may be affected.

B. Only as much of the roofing as can be made weathertight each day, including all flashing work, shall be installed.

C. All surfaces to receive insulation, membrane, or flashings shall be thoroughly dry. Should surface moisture occur, the contractor shall provide the necessary equipment to dry the surface prior to application.

D. All new and temporary construction, including equipment and accessories, shall be secured in such a manner, at all times, to preclude wind blow-off or damage.

E. Temporary waterstops shall be installed at the end of each day's work, and shall be removed before proceeding with the next day's work. Waterstops shall be compatible with all materials and shall not emit dangerous or incompatible fumes.

F. The contractor is cautioned that certain Sarnafil membranes are incompatible with asphalt and oil-based materials and cements. Creosote and penta-based materials are also incompatible. Such materials should not come into contact with Sarnafil membranes at any time. If such contacts occur, the material shall be cut out and discarded. The contractor should consult Sarnafil with respect to material compatibility, precautions, and recommendations.

G. Arrange work sequence to avoid use of newly constructed roofing for storage, walking surface, and equipment movement. Where such access is absolutely required, the contractor shall provide all necessary protection and barriers to segregate the work area and to prevent damage to adjacent areas. Both plywood and polyester felt protection shall be provided for all roof areas that receive traffic during construction.

H. Prior to and during application, all dirt, debris, and dust shall be removed from surfaces either by vacuuming, sweeping, blowing with compressed air, and/or similar methods.

I. All extra or scrap roofing, insulation, flashings, and metalwork removed from construction shall be handled and disposed of by the Contractor in accordance with the General Conditions.

J. The contractor shall follow all safety regulations as recommended by OSHA.

K. The contractor shall take care during application and storage that overloading of deck and structure does not occur.

L. Liquid materials such as solvents and adhesives shall be stored and used away from open flames, sparks, and excessive heat.

M. Contaminants, such as grease, fats, oils, and solvents, shall not be allowed to come into contact with the Sarnafil roofing membrane. Any such contact shall be reported to Sarnafil.

N. If any unusual or concealed condition is discovered, stop work and notify the owner and Sarnafil immediately in writing.

O. Site cleanup, including both interior and exterior building areas that have been affected by construction, shall be completed to the owner's satisfaction.

P. Sarnafil requires roofing contractor to run pullout tests of fasteners to verify condition of deck and to confirm pullout values.

1.06 WARRANTIES

A. Sarnafil's warranty: Provide Sarnafil's warranty for a period of 10 years; as follows:
   1. System Warranty: The Sarnafil Inc. System Warranty protects the building owner against the costs of repairing leakage resulting from defects in all components of the system supplied by Sarnafil, Inc., to include membrane, fasteners, and insulation, as well as from defects in the workmanship involved in their installation.

B. Roofing contractor's warranty: The roofing contractor shall supply the owner with a minimum two-year workmanship warranty. In the event any work related to roofing, flashings, or metalwork is found to be defective or otherwise not in accordance with the contract documents within two years of substantial completion, the roofing contractor shall remove and replace at no cost to the owner. The contractor's warranty obligation shall run directly to the owner, and a copy shall be sent to Sarnafil.

2. PRODUCTS

2.01 GENERAL

A. The components of the Sarnafil fully adhered roof system are to be products of Sarnafil Inc. as indicated on the detail drawings and specified in the contract documents. Substitutions will not be permitted.

2.02 MEMBRANE AND VERTICAL FLASHINGS AT INSULATION ON METAL DECK

A. Sarnafil G 410-L, 48 mils nominal (.047 inch) thickness, nonwoven fiberglass-reinforced membrane with a lacquer coating to repel dirt.

B. Membrane shall conform to ASTM D4434-85 Standard for polyvinyl chloride sheet roofing. Classification: Type II, Grade 1.

2.03 RELATED MATERIALS

A. Sarnafil membrane adhesive: The adhesive for bonding the Sarnafil G 410-L membrane to the insulation substrates shall be as follows:
   1. Sarnacol 2170 adhesive
      a. Use contact adhesive for bonding Sarnafil membranes to acceptable substrates.
      b. Application rates for bonding Sarnafil membranes and felts to various substrates shall be as directed by Sarnafil.

B. Flashing membrane adhesive: The adhesive for bonding Sarnafil flashing membrane to vertical flashings shall be Sarnacol 2170. Substrate must be compatible, clean, dry, and solvent resistant.

C. SarnaTred S 380 walkway: Polyester-reinforced PVC membrane .096 inch thick for traffic areas noted on roof plan.

D. Sarnaclad: G 410-L, .020-inch thick membrane laminated to 25-gauge galvanized sheet metal.

E. Sarnaflash: Prefabricated expansion joint cover with nailing flanges and welding flaps.

F. Sarnafelt: Nonasphaltic polyester felt used as leveling layer.

G. Sarnamatic welder: Automatic hot-air welding apparatus for seaming of sheets.

H. Prefabricated details: Inside/outside corners and vent stacks (2-inch, 3-inch, 4-inch, 5-inch diameters).

I. Sarnafastener: Self-tapping, corrosion-resistant fasteners for use in steel and wood decks.

J. Sarnastop: 16-gauge flat galvanized bar prepunched every 12 inches on center used for additional uplift resistance at the base of parapets, walls, curbs, peaks, valleys, and transitions.

K. Sarnasolv: A solvent cleaner for removal of Sarnacol adhesives from lap areas and for removal of contaminants from the Sarnafil membrane.

L. Sarnabar: 14-gauge galvanized steel bar, channel shaped, punched 1 inch on center, for use as a 4 foot perimeter bar and where required by Sarnafil.

M. Wood nailers
1. Wood nailers shall be treated for fire and rot resistance (wolmanized or osmose treated), #2 or better lumber. Cresote or asphaltic-treated lumber is not acceptable.
2. Wood nailers shall conform to Factory Mutual's Loss Prevention Data Sheet 1-49.
3. All wood shall have a maximum moisture content of 19% by weight on a dry weight basis.

N. Sealants
1. Monolastomeric, one-part acrylic, as manufactured by Tremco.
2. Silpruf, one-part silicone sealant, as manufactured by General Electric Co., or equal by Dow Corning.
3. GACO AS-3, one-part acrylic, as manufactured by Gates Engineering Co.

O. Pitch Pocket filler
1. GACO UWM-285, two-part urethane, as manufactured by Gates Engineering Co.

P. Miscellaneous fasteners and anchors: All fasteners shall be the same type as the metal being secured. In general all fasteners, anchors, nails, and straps, shall be of zinc or cadmium plated steel, galvanized, or stainless steel. All fasteners and anchors shall have a minimum embedment of 1-1/4 inches and shall be approved for such use by the fastener manufacturer. Fasteners for attachment of metal to wood blocking shall be annular ring nails. Fasteners for attachment of metal to masonry shall be expansion type fasteners. All fasteners shall meet Factory Mutual Standard 4470 for corrosion resistance.

Q. Sign
1. Engraved Laminated Plastic Interior Sign: Provide two engraved laminated plastic interior signs.
   a. Size: 18" x 12" x 1/8" thick
   b. Engraving Stock: Three ply laminated, low glare plastic of contrasting colors.
      1) Face and Back: Red
      2) Middle Ply: White
   c. Type Face: Helvetica, all caps
   d. Letter Size: Sign company shall prepare layout for approval using maximum size letters to provide clear legible notice.
   e. Wording

      CAUTION - (Largest Letters)
      Roof Surface Slippery
      when wet, dampness, frost, snow or ice are present
      Use Caution

   f. Engrave red surface to produce white letters
   g. Mounting - Four screws, one each corner and adhesive.
      1) Mount one as directed in the field on wall near base of stairway to roof, mount with screws.
      2) Mount second sign as directed in field on inside curb of roof hatch at toe of top step, mount with adhesive.

3. EXECUTION

3.01 GENERAL

A. The roofing contractor shall coordinate the installation so that each area is made watertight at the end of each work period.

3.02 DECK PREPARATION

A. The roof deck and roof construction must be structurally sound to provide support for the roof system. Provide fastener pullout tests to verify deck condition and fastener pullout values.

3.03 SUBSTRATE PREPARATION

A. A proper substrate shall be provided to receive the Sarnafil membrane and fully adhered system.

B. The roofing contractor shall inspect the substrate for defects such as excessive surface roughness, contaminated surfaces, structurally unsound substrates, etc., that will adversely affect the quality of work.

C. The substrate shall be clean, smooth, dry, free from flaws, sharp edges, loose and foreign material, oil, and grease. Roofing shall not start until all defects have been corrected.

D. All roof surfaces shall be free from water, ice, or snow.

3.04 WOOD NAILERS

A. Install continuous treated wood nailers at the perimeter of the entire roof and around roof projections and penetrations and as specified on project drawings.

B. Nailers shall be anchored to resist a minimum force of 175 pounds per lineal foot in any direction. Fastener spacing shall be a maximum of 3 feet on center. Fasteners shall be installed within 6 inches of each end. Spacing and fastener embedment shall conform to Factory Mutual Loss Prevention Data Sheet 1-49.

C. Thickness shall be as required to match substrate or insulation height.

3.05 INSULATION INSTALLATION AT METAL DECK

A. Mechanical attachment: See Section 07215.

3.06 INSTALLATION OF SARNAFIL MEMBRANES OVER INSULATION AT METAL DECK

A. The surface of the insulation and base sheet substrate shall be inspected prior to installation of the Sarnafil roof membrane. The substrate shall be clean, dry, and smooth with no excessive surface roughness, contaminated surfaces, or unsound surfaces such as broken or delaminated insulation boards, wrinkled or fish mouthed base sheets, etc.

B. Installation over Insulation Substrate:

1. Over the properly installed and prepared insulation substrate surface, Sarnacol 2170 adhesive shall be applied using approved solvent-resistant 3/4 inch nap paint rollers. The adhesive shall be applied at a rate of approximately 1-1/4 gallons per 100 square feet to the insulation. The adhesive shall be applied in a smooth, even coating with no holidays, globs, puddles, or similar irregularities. Only an area that can be covered completely in the same day's operations shall be coated with adhesive. The adhesive shall be allowed to dry completely prior to installing the membrane.

NOTE: Drying time increases with cooler temperatures. Also, the contractor is cautioned against work on days of high humidity because of extremely slow evaporation of the solvent. The contractor shall check with a Sarnafil representative prior to roof operations on such days.

2. When the adhesive on the insulation substrate is dry, the Sarnafil roof membrane is unrolled. Adjacent sheets shall be overlapped a minimum of 3 inches. Once in place, one-half of the sheet's length shall be turned back and the underside shall be coated with Sarnacol 2170 adhesive at a rate of 1/2 gallon per 100 square feet. When the adhesive has dried sufficiently to produce strings when touched with a dry finger, the coated membrane shall be rolled carefully onto the previously coated substrate to avoid wrinkles. Do not allow adhesive on the underside of the Sarnafil membrane to dry completely. The amount of membrane that can be coated with adhesive before rolling into substrate will be determined by ambient temperature, humidity, and manpower. The bonded sheet shall be pressed firmly into place with a weighted foam-covered lawn roller. The remaining unbonded half of the sheet shall be folded back and the bonding procedure repeated.

3. No bonding adhesive shall be applied in lap areas. All sheets shall be applied in the same manner, lapping all sheets as required by welding techniques.

C. Consult manufacturer concerning all application questions and problems.

3.07 HOT-AIR WELDING OF LAP AREAS

A. GENERAL

1. Adjacent sheets shall be welded in accordance with Sarnafil's written instructions. All side and end lap joints shall be hot-air welded. Lap area shall be a minimum of 3 inches wide when machine welding, and a minimum of 4 inches wide when hand welding.
2. Welding equipment shall be provided by or approved by Sarnafil. All mechanics intending to use the equipment shall have successfully completed a course of instruction provided by a Sarnafil representative prior to welding.
3. All surfaces to be welded shall be clean according to Sarnafil's instructions, and dry. No adhesive shall be present within the lap areas.

B. Hand welding: Hand welded seams shall be complete in three stages. Equipment shall be allowed to warm up for at least one minute prior to start of welding.

1. The lap shall be tack welded every 3 feet to hold the material in place.
2. The back edge of the lap shall be welded with a thin, continuous weld to prevent loss of hot air during the final welding.
3. The hot-air nozzle shall be inserted into the lap, keeping the welding equipment at a 45 degree angle to the side lap. Once the proper welding temperature has been reached and the material starts to flow, the hand roller shall be applied at a right angle to the welding gun and pressed lightly. For straight laps, the 1-1/2 inch wide nozzle shall be used. For corners and compound connections, the 3/4 inch wide nozzle shall be used.

C. Machine welding
   1. Machine welded seams may be achieved by the use of Sarnafil's various automatic welding equipment. When using this equipment, the manufacturer's instructions shall be followed and local codes for electric supply, grounding, and overcurrent protection observed. The automatic welding machines require 218 to 230 volts at 30 amps. The use of a portable generator is required.

D. Quality control of welded seams: All completed welded seams shall be checked after cooling for continuity using a rounded screwdriver or other suitable blunt object by the roofing contractor. Visible evidence that welding is proceeding acceptably is smoke during the welding operation, shiny membrane surfaces, and an uninterrupted flow of black material from the edge of completed joints. On-site evaluation of welded seams shall be made daily by the contractor at locations as directed by the owner's representative or Sarnafil's representative. Two-inch wide cross-sectional samples shall be taken three times a day minimum through completed seams. Correct welds display failure from shearing of the membrane prior to separation of the weld. Each test cut shall be patched by the contractor at no extra charge to the owner.

3.08 WALKWAY PROTECTION SHEET INSTALLATION

A. General: Walkways shall be provided for 6'-0" on all four sides around the roof hatch and where shown on the drawings.
   1. SarnaTred installation.
      a. Roofing membrane to receive SarnaTred and G459 shall be clean and dry.
      b. Chalk lines on deck sheet to indicate location.
      c. Apply a continuous coat of Sarnacol 2170 to the deck sheet at a rate of 3/4 gallon per 100 square feet. Keep adhesive back 3 inches from location lines (see Step b) for hot-air welding. Allow adhesive to dry completely.
      d. G459 and SarnaTred shall be unrolled and positioned within chalk lines, then folded back on itself exposing the underside for one-half of its length.

e. A continuous coat of Sarnacol 2170 adhesive shall be applied to the underside of the SarnaTred and G459 at a rate of 1/2 gallon per 100 square feet. Keep adhesive back 3 inches from the edge of the sheet for hot-air welding. This adhesive shall be allowed to dry sufficiently to produce strings when touched with a dry finger. Do not allow adhesive to dry completely. The amount of membrane that can be coated with adhesive before rolling into substrate will be determined by ambient temperature, humidity, and manpower.

f. The coated SarnaTred and G459 shall be unrolled into the previously coated deck sheet, using care to avoid wrinkles.

g. The bonded SarnaTred and G459 shall be pressed firmly into place with a weighted foam-covered lawn roller.

h. The remaining unbonded half of the sheet shall be folded back and the bonding procedure repeated.

i. Hot-air weld the perimeter of the SarnaTred and G459 to the Sarnafil deck sheet. Check all welds with a rounded screwdriver. Reweld any inconsistencies.

3.09 PERIMETER FASTENING

A. Provide Sarnastop perimeter bar continuously at perimeter of roof and around all roof openings. Fasten 12 inches on center. Cover with Sarnafil flashing strip.

3.10 MEMBRANE FLASHINGS

A. All flashings shall be installed concurrently with the roof membrane as the job progresses. No temporary flashings shall be allowed without the prior written approval of the project manager and Sarnafil. Approval shall only be for specific locations on specific dates. If any water is allowed to enter under the new roofing due to incomplete flashings, the affected area shall be removed and replaced at the contractor's expense. Flashings shall be adhered to compatible, dry, smooth, and solvent-resistant surfaces.

B. Flashing installation
   1. Over the properly prepared substrate surface, Sarnacol 2170 adhesive shall be applied using approved solvent-resistant paint rollers. The adhesive shall be applied at a rate of approximately 1-1/4 gallons per 100 square feet of wall surface. The adhesive shall be applied in smooth, even coatings with no holidays, globs, puddles, or similar irregularities. Only an area that can be covered completely in the same day's operations shall be coated with adhesive. The surface with adhesive coating shall be allowed to dry completely. Apply second coat of Sarnacol 2170 adhesive over the dry layer at the rate of 1 gallon per 100 sq. ft. and while still wet install the Sarnafelt separator sheet in smooth flat sheets. Press into place and allow adhesive to dry. Check all felt applications to ensure secure attachment. Remove and reglue any loose, insecure or partially attached areas and reinstall with fresh adhesive. NOTE: Drying time increases with cooler temperatures. Also, the contractor is cautioned against work on days of high humidity because of extremely slow evaporation of the solvent. The contractor shall check with the Sarnafil technical representative prior to roof operations on such days.
   2. When the surface is dry and all Sarnafelt has been checked, the Sarnafil G flashing membrane is cut to a workable length and the underside shall be coated evenly with Sarnacol 2170 adhesive at a rate of 1/2 gallon per 100 square feet. While the adhesive is still wet, carefully roll it onto previously installed Sarnafelt. The amount of membrane that can be coated with adhesive before applying to substrate will be determined by ambient temperature, humidity, and manpower. Adjacent sheets shall be overlapped a minimum of 4 inches. Sarnafil flashings shall extend 5 inches onto the roofing membrane. The bonded sheet shall be pressed firmly into place with a hand roller.
   3. No bonding adhesive shall be applied in lap areas that are to be welded to flashings or adjacent sheets. All sheets shall be applied in the same manner, lapping all sheets as required by welding techniques.

C. Install Sarnastop fastened 12 inches on center with acceptable fasteners into the structural deck at the base of parapets, walls, and curbs. Sarnastops shall also be installed at the base of tapered edge strips and at transitions, peaks, and valleys according to Sarnafil's recommended details.

D. Sarnafil's requirements and recommendations and the specifications shall be followed. All material submittals shall have been accepted by Sarnafil prior to installation.

E. All flashings shall extend a minimum of 8 inches above roofing level unless previously accepted by the owner's representative and Sarnafil.

F. All flashing membranes shall be fully adhered to solvent-resistant substrates. All interior and exterior corners and miters shall be cut and hot-air welded into place. No bituminous elements shall be in contact with the Sarnafil membrane.

G. All flashings shall be hot-air welded at their joints and at their connections with the roof membrane.

H. All flashing membranes shall be mechanically attached along the top edge through tin discs spaced a maximum of 1 foot on center, or predrilled metal strips. Expansion pins with nylon sheaths set in predrilled holes shall be used to secure flashings to masonry and concrete surfaces.

I. Sarnafil flashings shall be terminated according to Sarnafil recommended details.

3.11 METAL FLASHINGS - SEE SECTION 07600 FOR ADDITIONAL REQUIREMENTS

A. Metal, other than Sarnaclad metal, is not covered under the Sarnafil warranty.

B. Complete all metalwork in conjunction with roofing and flashings so that a watertight condition exists daily.

C. Metal shall be installed to provide adequate resistance to bending and to allow for normal thermal expansion and contraction.

D. Metal joints shall be watertight.

E. Metal flashings shall have a 4-inch minimum nailing flange and shall be fastened into solid wood blocking with fasteners of the same type with two rows of annular ring nails, 4 inches on center, staggered. Fasteners shall penetrate the wood nailer a minimum of 1-1/4 inches.

F. Continuous internal metal hook strips are required at all gravel stops and fascia pieces. Hook strip is to be fastened 12 inches on center into wood nailer.

3.12 TEMPORARY CUTOFF

A. All flashings shall be installed concurrently with the roof membrane in order to maintain a watertight condition as the work progresses. When a break in the day's work occurs in the central area of a roof, a temporary waterstop shall be constructed to provide a 100% watertight seal. When work on the new system is suspended, the stagger of the insulation joints shall be maintained by installing partial fillers. The new membrane shall be carried into the waterstop. The waterstop shall be sealed to the deck and/or substrate so that water will not be allowed to travel under the new roofing. The edge of the membrane shall be sealed in a continuous heavy application of roof cement of 6 inches in width. When work resumes, the contaminated PVC membrane shall be cut out. All sealant, contaminated membrane, insulation fillers, etc., shall be removed from the work area and disposed of off site. None of these materials shall be used in the new work.

B. If inclement weather occurs while a temporary waterstop is in place, the contractor shall provide the labor necessary to monitor the situation to maintain a watertight condition.

C. If any water is allowed to enter under the newly completed roofing, the affected area shall be removed and replaced at the contractor's expense.

3.13 COMPLETION

A. Prior to demobilization from the site, the work shall be reviewed by the owner, architect and contractor. All defects noted, non-compliances with the specifications, and the recommendations of Sarnafil shall be itemized in a punch list. These items must be corrected immediately by the contractor prior to demobilization to the satisfaction of the owner, architect, and Sarnafil.

B. All warranties, as required in Part 1 of this specification, shall be submitted for approval prior to final payment.

3.14 SIGN

A. Provide two engraved plastic signs in the building one at the top of the roof access stair and one at the bottom. Provide one screw with surface grommet in each corner of sign for wall mountings and mount upper signs to roof hatch curb with adhesive.

END OF SECTION

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

SECTION 07600 - FLASHING AND SHEET METAL

1. GENERAL

1.01 SCOPE

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to work specified in this Section.

B. Work by this Section includes but is not limited to:
1. Gravel Stop
2. Fascia
3. Counter flashing and through wall flashing.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 04200 - Unit Masonry

B. Section 05500 - Metal Fabrications

C. Section 07215 - Rigid Roof Insulation

D. Section 07532 - Fully Adhered Single Membrane Roofing

2. PRODUCTS

2.01 FLASHING

A. Counter flashing through wall flashing, control joints plumbing vent stacks.
1. Conforming to ASTM B301, Type 1, Class A.
a. Copper 20 oz. cold rolled.
b. Lead coating on both sides 6 to 7-1/2 lbs. per 100 SF.

B. Gravel stop, and fascia material:
1. Sarna metal.

2.02 FASTENERS

A. Nails: Copper in copper, aluminum or stainless steel in aluminum, Sarnafil approved in Sarna metal, flathead, wire, barbed slating type, FS FF-N-105C.

B. Screws: Self tapping sheet metal type, FS FF-S-107C-1 material, bronze in copper.

C. Rivets: Bronze in copper material, type and size recommended by sheet metal manufacturer.

2.03 SOLDER

A. ASTM B32-76; Alloy grade 58, 50% tin, 50% lead.

2.04 FLUX

A. FS O-F-506, Type 1

2.05 CEMENT

A. As recommended by roof membrane manufacturer.

2.06 FABRICATION

A. Cleats
1. Same material and thickness as sheet metal.
2. Internal & continuous.

3. EXECUTION

3.01 INSPECTION

A. Verify that substrates are smooth and clean to extent needed for sheet metal work.

B. Verify that reglets, nails, cants, and blocking to receive sheet metal are installed and free of concrete and soil.

C. Do not start sheet metal work until conditions are satisfactory.

3.02 PREPARATION

A. Before installing sheet metal verify shapes and dimensions of surface to be covered.

3.03 INSTALLATION

A. General
1. Install work watertight without waves, warps, buckles, fastening stresses or distortion, allowing for expansion and contraction.

B. Cleats
   1. Continuous internal cleats

C. Soldering
   1. Clean, flux and pre tin metals prior to soldering.
   2. Sweat solder completely through seam width.

D. Sealant Installation: Apply 1/4 inch diameter bead, centered on full length of joint of butted gravel stop. At joints above counter flashing provide sealant joint.

E. Gravel stops, and fascia:
   1. Form gravel stop, and fascia, as shown.
   2. Fabricate joints with internal splice plate and miter corners.
   3. Fit edge into cleat secured to substrate.
   4. Splice plate shall extend four inches each side of joint.
   5. Set cover pieces in full bed of sealant on splice plate.

F. Pluming Vent Caps
   1. Solder 1/4" galvanized wire mesh to top of lead coated copper pluming vent caps.

G. Install flashing and sheet metal to comply with Architectural Sheet Metal Manual, Sheet Metal and Air Conditioning Contractor's National Association, Inc.

3.04 REPAIRING

A. Repair or replace damaged work.

3.05 CLEANING

A. As work progresses, neutralize excess flux with 5 to 10% washing soda solution, and thoroughly rinse.

B. Leave work clean and free of stains, scrap and debris.

END OF SECTION

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

SECTION 07724 - ROOF HATCH

1. GENERAL

1.01 SCOPE

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to work specified in this Section.

B. Work by this Section includes but is not limited to:
1. Prefabricated roof hatch with integral support curbs, operable hardware, and counterflashing.

1.02 RELATED WORK

A. Section 05500 - Metal Fabrications.

B. Section 07532 - Fully Adhered Single Membrane Roofing System.

1.03 SUBMITTALS

A. Submit shop drawings and product data in accordance with Section 01300, Submittals.

B. Include general construction, configurations, jointing methods and locations when applicable, and fastening methods.

2. PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Bilco Model L

B. Dur-Red Model NSH A

C. Substitutions: Under provisions of General Conditions.

2.02 ROOF HATCHES

A. Unit: 2'-6" x 8'-0" single leaf type.

B. Curb: 12" high, 11 gage mill finished aluminum with 1 inch rigid insulation, aluminum liner integral cap flashing to receive roof flashing system; extended flange for mounting.

C. Hardware: Manufacturer's standard manually operated type with compression spring operators, positive snap latch with turn handles inside and out and padlock hasp inside: automatic hold-open arm with vinyl covered grip handle for easy release: cadmium plated finish.

D. Hinges: Manufacturer's recommended type.

2.03 FABRICATION

A. Fabricate free of visual distortions and defects, weld corners and joints.

B. Provide for removal of condensation.

C. Provide weathertight assembly.

3. EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions. Coordinate with installation of roofing system and related flashings. Provide weathertight installation.

END OF SECTION

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

SECTION 07810 - PLASTIC SKYLIGHTS

1. GENERAL

1.01 SCOPE

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to work specified in this Section.

B. Work by this Section includes but is not limited to:
1. Prefabricated plastic skylights without prefabricated curbs.

1.02 RELATED WORK

A. See Bidding Requirements: Alternates work under this Section is affected by Alternate "B", see fixed price proposal form.

B. Section 05500 - Metal Fabrications.

C. Section 06001 - Rough Carpentry

D. Section 07532 - Fully Adhered Single Membrane Roofing System (Sarnafil)

1.03 SUBMITTALS

A. Submit shop drawings and product data in accordance with Section 01300, Submittals.

B. Submit shop drawings.

C. Clearly indicate general construction, configurations, jointing methods and locations when applicable, fastening methods and installation details.

2. PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS AND INSTALLERS, SKYLIGHTS AND CEILING UNITS

A. Manufacturer:
1. PAM
2. WASCO

B. Substitutions in accordance with General Conditions.

2.02 MATERIALS

A. Rectangular Skylights
1. Construction: Clear outer convex dome and white translucent acrylic plastic inner convex dome. Sealed double dome; complete with extruded aluminum thermally broken frame system with integral drainable condensation gutters and constructed for installation on site constructed curb.
2. Size: Nominal 48" x 96".

2.03 FABRICATION

A. Fabricate skylights weathertight, and free of visual distortions and defects.

3. EXECUTION

3.01 INSTALLATION

A. Install skylights in accordance with manufacturer's instructions. Coordinate with the installation of roofing system and related flashings. Provide weathertight installation.

END OF SECTION

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

SECTION 07900 - SEALANTS

1. GENERAL

1.01 SCOPE

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to work specified in this Section.

B. Work by this Section includes but is not limited to the provision of sealants in all areas other than those which receive the protective coating specified in Section 09950.
   1. Fire rated sealant around pipe, conduit duct and miscellaneous wall penetrations.
   2. Sealant at plumbing fixtures.
   3. Sealant at joints of dissimilar materials, at door bucks, insulated metal panel, louvers, etc.
   4. Sealant at control and expansion joints.
   5. Sealant at concrete slab perimeters and penetrations.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 04200: Unit Masonry

B. Section 08800: Glazing

1.03 SUBMITTALS

A. Provide submittals in accordance with Section 01300, Submittals.

B. Submit manufacturer's product data and color chart. Data shall indicate conformity to reference specifications listed below. Include requirements for primers, if any.

1.04 QUALITY ASSURANCE

A. Approved Manufacturers:
   1. Tremco
   2. Pecora
   3. DAP
   4. Dow
   5. General Electric

2. PRODUCTS

2.01 MATERIALS

A. Sealant for lavatories and other plumbing fixtures: Fungicidal - one part silicone rubber sealant conforming to the requirements of FS TT-S-001543, Class A or B, especially made for the specified use. Color: White.

B. Sealant for tile control joints and other interior control joints: Two part polysulfide sealant conforming to the requirements of FS TT-S-00227C.

C. Sealant around pipe, conduit, duct and other wall penetrations: Dow Corning Fire Stop sealant, floor/wall penetration seal design System 129, UL classified.

D. Sealant for exterior uses control joints, expansion joints, joints between dissimilar material and penetrations in exterior walls. Two part polyurethane (non sag) maximum movement capacity, 50%/50%, TTB-227E, Type II, ASTM D1850, ASTM C920; color selection equal to Pecora Dynatrol II.

E. Sealant for concrete slab perimeters and around penetrations in floor slab: Multi component self leveling urethane sealant. Maximum movement capacity +/- 25%, meeting or exceeding TT-S-227E and ASTM C-920.

F. Primers: As recommended by sealant manufacturer for sealant and building surfaces where used.

G. Joint Backing: Expanded or extruded closed-cell polyethylene for joints open in back and joints requiring filler to create proper depth and polyethylene bond breaker tape for joints closed in back.

H. Preformed Tape Sealant: Precompressed foam sealant, Will-Seal 150 manufactured by Illbruck. Provide manufacturers recommended sizes for various joints.

3. EXECUTION

3.01 PREPARATION

A. Clean surfaces to which sealant is to be applied. Brush off dust. Remove loose materials; wash off grease, oil and other contaminants. Apply primers if required.

3.02 APPLICATION

A. Apply sealant only to dry surfaces on a relatively dry day at temperature of 40 degrees or above.

B. Seal openings in exterior walls, including mechanical openings, joints between different materials and components. Seal both inside and outside. Seal joints around plumbing fixtures. Seal control joints in exterior and interior walls. Seal tile control joints. Note: If the word "caulk" appears on drawings, it means "seal". Seal around all penetrations in rated wall assemblies. Seal full perimeter of all new concrete slabs. Seal around full perimeter of all penetrations in new concrete slabs.

C. Provide primer on all surfaces recommended by sealant manufacturer.

D. Apply joint backing to joints open in back or over 1/2" deep. Compress backing so as to form a firm stop which will resist sealant pressure. Provide bond breaker tape in shallow joints.

E. Drive sealant into joints, filling from the bottom up. Tool joints to produce neat, tightly adhering beads.

F. Clean up spills, using solvent recommended by manufacturer.

END OF SECTION

DIVISION 8 - DOORS AND WINDOWS

SECTION 08100 - CUSTOM METAL DOORS AND FRAMES

1. GENERAL

1.01 SCOPE

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to work specified in this Section.

B. Work by this Section includes but is not limited to:
1. Hollow metal door frames.
2. Hollow metal doors.

1.02 RELATED WORK

A. Section 04200 - Unit Masonry

B. Section 05500 - Metal Fabrication.

C. Section 08700 - Finish Hardware

D. Section 08800 - Glazing

E. Section 09900 - Painting

1.03 QUALITY CRITERIA

A. Manufacturer: Hollow metal work shall be manufactured by a manufacturer who has been established in this specific trade for a minimum of five years.

1.04 SUBMITTALS

A. Provide submittals in accordance with Section 01300, Submittals.

B. Shop Drawings:
1. Submit shop drawings covering each type of door and frame, frame conditions, complete anchorage details and hollow metal trim section, supplemented by suitable schedules covering doors and frames.
2. Show glass opening sizes and locations in doors.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and handle hollow metal work in manner to prevent damage and deterioration.

B. Provide packaging such as cardboard or other containers, separators, banding, spreaders, and paper wrappings to protect hollow metal items.

C. Store doors upright, in a protected dry area, at least 1/4" between individual pieces.

D. Follow special storage and handling requirements of manufacturer.

E. Protect exposed finish surfaces or prefinished items with masking tape.

2. PRODUCTS

2.01 BASIC MATERIALS

A. Sheet steel for frames shall be hot rolled prime quality carbon steel.

B. Sheet steel for doors shall be cold rolled stretcher level sheet steel.

2.02 FRAMES

A. Frames shall be combination buck, frame and trim type.

B. Minimum gauges: 14 gauge galvanized steel.

C. Brake-form steel sheets:
1. Provide profiles and shapes free of warp, buckles, fractures, or other defects.
2. Form stops integral with frames unless otherwise shown.

D. Corners and connections shall be mitered and welded with exposed welds ground flush and smooth.

E. Anchors:
1. Provide an anchor at each jamb for each 2'-6" of door height or fraction thereof.
2. Vary anchor types to provide positive fastening to adjacent construction.
3. Secure a metal clip angle at bottom of each jamb member for anchoring to floor, with a minimum of two fasteners.

F. Stops and Trim:
1. Applied stops shall be formed of 20 ga. steel, corner made to a close, neat fit, and secured at 12" intervals with countersunk sheet metal screws.

2.03 DOORS

A. Face sheets shall be 14 gauge galvanized steel.

B. Construction:
   1. Vertical edges of face panels shall be joined and welded, then ground smooth to conceal seams. Tops of exterior doors shall be flush.

C. Epoxy bond, resin impregnated honeycomb core to face sheets for interior, non fire rated doors. High density polyisocyanurate insulation for exterior doors. U.L. mineral core for "A" and "B" label doors.

D. Glazing Stops: 20 ga. steel, secured with countersunk sheet metal screws at minimum 12" intervals. Glazing stops shall be flush with surface of door.

2.04 LABELED FIRE DOORS AND FRAMES

A. Doors and frames designated to be labeled shall bear permanent metal Underwriters Laboratories Inc. label; "A" label shall be 3 hr. "B" label: 1-1/2 hr.

2.05 PREPARATION FOR FINISH HARDWARE

A. Prepare doors and frames to receive hardware:
   1. Hardware supplier shall furnish hollow metal manufacturers approved hardware schedule, hardware templates, and samples of physical hardware where necessary to insure correct fitting and installation.
   2. Preparation includes sinkages, mortar and dust boxes, and cut-outs for mortise and concealed hardware and rubber silencers. Locksets, latchsets, and hinges are to be mortised.

B. Provide reinforcements for both concealed and surface applied hardware:
   1. Drill and tap mortise reinforcements at factory, using templates.
   2. Install reinforcements with concealed connections designed to develop full strength of reinforcements.

2.06 FINISH

A. Doors and frames shall be leveled and ground smooth.

B. Apply mineral filler to eliminate weld scars and other blemishes.

C. Give factory coat of rust-inhibitive metal primer prepared for field painting.

3. EXECUTION

3.01 INSTALLATION OF FRAMES

A. Exercise care in setting of frames to maintain scheduled dimensions, hold head level and maintain jambs plumb and square.

B. Secure anchorages and connections to adjacent construction.

C. Wherever possible, leave frame spreader bars intact until frames are set perfectly square and plumb, and anchors are securely attached.

3.02 INSTALLATION OF DOORS

A. Apply hardware in accord with hardware manufacturer's templates and instructions.

B. Adjust operable parts for correct function.

C. Remove hardware, with the exception of prime-coated items, tag, box and reinstall after finish paint work is completed.

D. Installation of labeled doors shall conform with the State of Connecticut Building Code. (BOCA 1987 with 1988 supplement and NFPA 80.

E. Doors shall be hung with 1/8" space at head and jambs with 3/16" clearance over thresholds, 3/8" where no threshold occurs unless noted otherwise on door schedule. Clearance at pairs of doors shall be minimum required for operation. Clearance between pairs of smoke and fire doors must be maintained to meet U.L. and manufacturer's label requirements without mullion or astragal.

3.03 PRIME COAT TOUCH-UP

A. Immediately after erection, areas where prime coat has been damaged shall be sanded smooth and touched up with same primer as applied at shop.

B. Remove rust before above specified touch-up is applied.

C. Touch-up shall not be obvious.

3.04 PROTECTION

A. Protect installed hollow metal work against damage from other construction work.

END OF SECTION

DIVISION 8 - DOORS AND WINDOWS

SECTION 08331 - OVERHEAD COILING DOORS

1. GENERAL

1.01 SCOPE

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to work specified in this Section.

B. Work by this Section includes but is not limited to:
1. Fire rated overhead coiling doors operating hardware, electric operation.
2. Insulated coiling overhead doors, operating hardware, electric operator.

1.02 RELATED SECTIONS

A. Section 05500 - Metal Fabrication: Channel and tube frames.

B. Section 09900 - Painting: Field paint finish.

C. Division 16 - Electrical: For electrical and fire alarm interconnection.

1.03 REFERENCES

A. ANSI/ASTM A526 - Steel Sheet, Zinc-coated (Galvanized) by the Hot-Dip Process, Commercial Quality.

B. ASTM A525 - General Requirements for Steel Sheet, zinc-coated (Galvanized) by the Hot-Dip Process.

C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

D. NEMA ICS 2 - Standards for Industrial Control Devices, Controllers and Assemblies.

E. NEMA MG1 - Motors and Generators.

F. ULI - Underwriters' Laboratories Inc.

1.04 SYSTEM DESCRIPTION

A. Electric motor operated unit with manual override in case of power failure.

B. Fire rated door fusible link and fire alarm system activated with automatic governed closing speed.

C. Surface mounted.

1.05 DESIGN REQUIREMENTS

A. Design door assembly to withstand wind/suction load of 20 psf, without undue deflection or damage to door or assembly components.

1.06 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Shop Drawings: Indicate pertinent dimensioning, anchorage methods, hardware locations, and installation details.

C. Product Data: Provide general construction, component connections and details, and electrical equipment.

D. Provide oversized certificate.

E. Manufacturer's Installation Instructions: Indicate installation sequence and procedures, adjustment and alignment procedures.

1.07 MAINTENANCE DATA

A. Submit under provisions of Section 01700.

B. Maintenance Data: Indicate lubrication requirements and frequency, periodic adjustments required.

1.08 REGULATORY REQUIREMENTS

A. Conform to applicable code for Class A 3 hour fire rated opening.

B. Electrical Components: UL listed.

C. National Electric Code: Article 500.

1.09 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop drawings.

1.10 COORDINATION

A. Coordinate the work with installation of electric power, locations and size of conduit.

2. PRODUCTS

2.01 FIRE RATED OVERHEAD DOORS

A. Manufacturers
1. Apton, Model FFM.
2. Ceco/Windsor, Model FFD.
3. Cookson, Model FD5.

B. Materials
1. Curtain: Fire rated in accordance with requirements scheduled; conforming to the following:
a. Slats: Interlocking, minimum 18 gage of ANSI/ASTM A526 steel, galvanized to minimum 1.25 oz/sq ft coating in accordance with ASTM A525; single thickness slat.
b. Nominal Slat Size: 3 inches wide x required length.
c. Slat Ends: Each slat fitted with end locks to act as wearing surface in guides and to prevent lateral movement.
d. Curtain Bottom: Fitted with angles to provide reinforcement and positive contact with floor in closed position.
2. Guides: 9 gage steel track formed continuous, vertical mounted; galvanized steel mounting brackets.
3. Roller Shaft Counterbalance: Steel pipe and helical steel spring system, capable of producing torque sufficient to assure smooth operation of curtain from any position; with adjustable spring tension.
4. Hood Enclosure: 24 gage galvanized steel; internally reinforced to maintain rigidity and shape.
5. Hardware:
a. Weatherstripping: Moisture and rot proof, resilient type, located at jamb edges, and bottom of curtain.
6. Fire Alarm Release Mechanism: Electric operated from fire alarm system.

C. Electric Operator
   1. Electric Operator:
      a. Description: ANSI/UL 325, side mounted.
      b. Motor Enclosure: NEMA MG1 Type; open drip proof.
      c. Motor Rating: 1 hp; continuous duty.
      d. Motor Voltage: 460 volt, three phase, 60 Hz.
      e. Motor Controller: NEMA ICS 2, full voltage, reversing magnetic motor starter.
      f. Controller Enclosure: NEMA 250 Type.
      g. Door Speed: 12 inches per second.
      h. Brake: Adjustable friction clutch type, activated by motor controller.
   2. Control Station: Standard three button (open-close-stop) control for each operator; 24 volt circuit. Provide two explosion-proof stations for doors 45 and 46.
   3. Safety Edge: Located at door bottom, full width, electro-mechanical sensitized type, wired to reverse door upon striking object, hollow neoprene covered weather seal.

D. Finishes
   1. Curtain Slats: Galvanized steel.
   2. Steel Guides and Hood Enclosure: Prime paint prepare for paint finish.

2.02 INSULATED OVERHEAD DOORS

A. Manufacturers
   1. Apton, Insulator Door.
   2. Ceco/Windsor, Model SFW1.
   3. Cookson, Model FMW1.

B. Materials
   1. Curtain:
      a. Slats: Interlocking, exterior skin minimum 20 gage interior skin 22 gauge of ANSI/ASTM A526 steel, galvanized to minimum 1.25 oz/sq ft coating in accordance with ASTM A525; insulation, urethane.
      b. Nominal Slat Size: 3 inches wide x required length.
      c. Slat Ends: Each slat fitted with end locks to act as wearing surface in guides and to prevent lateral movement with weather seal.
      d. Curtain Bottom: Fitted with angles to provide reinforcement and positive contact with floor in closed position with weather seal.
      e. Provide vision panels.
   2. Guides: 9 gage steel track formed continuous, vertical mounted; galvanized steel mounting brackets.

3. Roller Shaft Counterbalance: Steel pipe and helical steel spring system, capable of producing torque sufficient to hssure smooth operation of curtain from any position; with adjustable spring tension.
4. Hood Enclosure: 24 gage galvanized steel; internally reinforced to maintain rigidity and shape.
5. Hardware:
   a. Weatherstripping: Moisture and rot proof, resilient type, located at jamb edges, and bottom of curtain.

C. Electric Operator
1. Electric Operator:
   a. Description: ANSI/UL 325, side mounted.
   b. Motor Enclosure: NEMA MG1 Type; open drip proof.
   c. Motor Rating: 1 hp; continuous duty.
   d. Motor Voltage: 460 volt, three phase, 60 Hz.
   e. Motor Controller: NEMA ICS 2, full voltage, reversing magnetic motor starter.
   f. Controller Enclosure: NEMA 250 Type.
   g. Door Speed: 12 inches per second.
   h. Brake: Adjustable friction clutch type, activated by motor controller.
2. Control Station: Standard three button (open-close-stop) control for each operator; 24 volt circuit explosion proof at doors noted.
3. Safety Edge: Located at door bottom, full width, electro-mechanical sensitized type, wired to reverse door upon striking object, hollow neoprene covered weather seal.
4. Provide remote beepers and remote beeper operation for overhead doors at top and bottom of fork lift ramp; interlock doors so only one of these two doors can be opened at a time. Provide keyed override switch to over ride interlock and allow normal operation.
5. Provide two control stations one on each side of door (opposite sides of wall) for doors #4, 8, 13 & 20.
6. Provide expossion proof controls for doors #8, 10, 11, 13, 30 & 31.

D. Finishes
1. Curtain Slats: Galvanized steel. Prime paint prepare for paint finish.
2. Steel Guides and Hood Enclosure: Prime paint prepare for paint finish.

2.03 SPECIAL REQUIREMENTS

A. Dual Controls
1. Provide two control stations one on each side of door (opposite sides of wall) for doors #8, 13, 20, 101 & 102.

B. Explosion Proof Motors and Controls
1. Provide Class 1, Division 1 explosion proof controls and motors for doors #8, 10, 11, 13, 30, 31 & 45.

3. EXECUTION

3.01 EXAMINATION

A. Verify that opening sizes, tolerances and conditions are acceptable.

3.02 INSTALLATION

A. Install door unit assembly in accordance with manufacturer's instructions.

B. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.

C. Securely brace components suspended from structure. Secure guides to structural members only.

D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.

E. Coordinate installation of electrical service with Division 16. Complete wiring from disconnect to unit components and from fire alarm system to door operator.

F. Coordinate installation of sealants and backing materials at frame perimeter as specified in Section 07900.

G. Install perimeter trim and closures.

3.03 ERECTION TOLERANCES

A. Maintain dimensional tolerances and alignment with adjacent work.

B. Maximum Variation from Plumb: 1/16 inch.

C. Maximum Variation from Level: 1/16 inch.

D. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch per 10 ft straight edge.

3.04 ADJUSTING

A. Adjust door, hardware and operating assemblies.

3.05 CLEANING

A. Clean work under provisions of 01700.

B. Clean door and components.

C. Remove labels and visible markings.

END OF SECTION

DIVISION 8 - DOORS AND WINDOWS

SECTION 08520 - ALUMINUM WINDOWS

1. GENERAL

1.01 SCOPE

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to work specified in this Section.

B. Work of this Section includes but is not limited to:
   1. Extruded aluminum windows with operating sash.
   2. Glass and glazing.
   3. Operating hardware.

1.02 RELATED WORK

A. Section 07900 - Sealants

B. Section 08800 - Glazing

1.03 REFERENCES

A. ANSI/AAMA - 101-88.

B. ANSI/ASTM A36 - Structural Steel.

C. ANSI/ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

D. ANSI/ASTM A386 - Zinc-Coating (Hot-Dip) on Assembled Steel Products.

E. ANSI/ASTM B221 - Aluminum-Alloy Extruded Bar, Rod, Wire, Shape and Tube.

F. ANSI/ASTM E283 - Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors.

G. ANSI/ASTM E330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

H. ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.

1.04 SYSTEM DESCRIPTION

A. Windows: Inswinging.

B. Glazing: Interior.

1.05 PERFORMANCE

A. Window units shall meet or exceed the requirements of P-HC40 in accordance with ANSI/AAMA 101-88.

1.06 SUBMITTALS

A. Submit shop drawings and product data under provisions of Section 01300.

B. Include wall opening and component dimensions; wall opening tolerances required; anchorage and fasteners; affected related work; and installation requirements.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver and handle window units under provisions of General Conditions.

B. Store and protect window units under provisions of General Conditions.

C. Provide wrapping to protect prefinished aluminum surfaces.

1.08 WARRANTY

A. Provide three year manufacturer's warranty.

B. Warranty: Cover complete window system for failure to meet specified requirements.

2. PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Established aluminum window manufacturer having been in business for five years manufacturing a full line of aluminum windows.

2.02 MATERIALS

A. Extruded Aluminum: ANSI/ASTM B221; 6063; alloy, T-5 temper.

2.03 FABRICATED COMPONENTS

A. Frames: Nominal 2 inches deep profile, of .125 inch thick section; thermally broken with interior portion of frame insulated from exterior portion, glass stops of snap-on type.

B. Sills: .125 inch thick, extruded aluminum; sloped for positive wash; slope depth for under sash leg 1/2 inch beyond wall face; one piece full width of opening.

C. Insect Screens: FS RR-W-365, woven aluminum mesh; 14/18 mesh size; fitted taught in tubular aluminum frame. Miter and reinforce frame corners; provide with spring loaded steel retainer pins. Provide exterior insect screen on all operable sash.

D. Operable Sash Weatherstripping: Resilient PVC; permanently resilient, profiled to effect weatherseal.

E. Operable Sash Hardware: Stainless steel 4 bar Anderberg type hinges; nylon slides with positive position stop, inswinging windows.

F. Fasteners: Stainless steel.

2.04 GLASS AND GLAZING MATERIALS

A. Glass and Glazing Materials: Specified in Section 08800.

B. Glass: Insulating glass.

2.05 FABRICATION

A. Fabricate windows allowing for minimum clearances and shim spacing around perimeter of assembly, yet enabling installation.

B. Rigidly fit and weld joints and corners. Accurately fit and secure corners tight. Make corner joints flush, hairline, and weatherproof. Seal corner joints with sealant.

C. Develop drainage holes with moisture pattern to exterior.

D. Prepare components to receive anchor devices. Fabricate anchorage items.

E. Prepare components with internal reinforcement for operating hardware.

2.06 FINISHES

A. Exterior and Interior Aluminum Surfaces: Factory baked-on acrylic enamel, color to be selected by Architect from manufacturers full selection of off white.

B. Concealed Steel Items: Galvanized in accordance with ANSI/ASTM A386 to 2.0 oz/sq ft.

C. Apply one coat of bituminous paint to concealed aluminum and steel surfaces in contact with cementitious or dissimilar materials.

3. EXECUTION

3.01 INSPECTION

A. Verify wall openings are ready to receive work of this Section.

B. Beginning of installation means acceptance of existing conditions.

3.02 INSTALLATION

A. Install window frames and hardware in accordance with manufacturer's instructions.

B. Use anchorage devices to securely attach frame to structure.

C. Align window frame plumb and level, free of warp or twist. Maintain dimensional tolerances, aligning with adjacent work.

D. Install under sill flashings.

E. Pack fibrous insulation in shim spaces at perimeter to maintain continuity of thermal barrier.

F. Install glass in accordance with Section 08800, using wet method of glazing.

G. Install perimeter sealant, backing materials, and installation requirements in accordance with Section 07900. Apply sealant to ends of sill for watertight seal.

H. Adjust operable hardware for smooth operation and tight fit of sash. Provide nylon limit blocks as directed by Architect in the field.

I. Provide insect screens at all operable sash.

3.03 CLEANING

A. Remove protective material from prefinished aluminum surfaces.

B. Wash down exposed surfaces using a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

C. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

END OF SECTION

DIVISION 8 - DOORS AND WINDOWS

SECTION 08700 - FINISH HARDWARE

1. GENERAL

1.01 SCOPE

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to work specified in this Section.

B. Work by this Section includes but is not limited to:
1. Finish hardware for doors and frames.

1.02 RELATED WORK

A. Section 08100: Custom Metal Doors and Frames.

1.03 TYPE AND QUALITY:

A. Numbers used herein for the basic specification are taken from the catalogs of Corbin-Russwin, Stanley Works, Dor-o-matic, Ives Co., LCN and Zero Mfg. Co.

B. The various items of Hardware specified have been selected as the standards; however, the products of other reputable manufacturers of equivalent design, quality and function may be substituted except Stanley, Rixson, VonDuprin, LCN, Zero, Glynn-Johnson, Colonial etc. provided these products are proven equal and are approved by the Architect.

1.04 SCOPE

A. This Contractor shall furnish all Finishing Hardware necessary to fully and adequately equip the building as required by the detail drawing and as herein specified.

B. This Contractor will be responsible for examination of and preparation of his own Hardware Schedule from the plans and specifications. He will be responsible for the correctness of quantities, sizes, finishes and proper hardware to be furnished whether specifically mentioned or not. Hardware not listed specifically must be furnished to match other Hardware in similar openings.

C. In the event there is conflict between the type of Hardware specified and the structural details, the matter shall be submitted to the Architect, a suitable substitution adopted and the Architects decision shall be final.

1.05 SAMPLES:

A. Submit samples in accordance with Section 01300, Submittals.

B. Samples of all items of Finish Hardware shall be submitted on request for approval by the Architect.

C. Samples shall be tagged with manufacturer's name, schedule number and substitution number for proper identification of item.

D. Samples will be held by the Architect until completion of the project for inspection by the proper authorities during the final construction period.

1.06 DETAIL & RESPONSIBILITY:

A. The Finishing Hardware supplier is responsible for all details such as hands of doors, bevel of locks, correct labeling and proper hardware for the specific opening.

B. The successful hardware contractor shall have in his employ two or more members of The American Society of Architectural Hardware Consultants in order to insure proper procedure in the handeling of Contract Builders' Hardware.

1.07 TEMPLATES:

A. Copies of templates or template numbers for template books along with approved Hardware Schedules shall be supplied to the various trades on approval of their shop drawings.

B. This Contractor shall be responsible for reviewing the approved shop drawing to insure proper fitting of various items of finished hardware specified on the Schedule.

1.08 DELIVERY & PACKING:

A. This Contractor shall deliver Hardware where and when the Architect or General Contractor shall so direct.

B. The Hardware shall be packed separately, complete with necessary screws, bolts and washers, and clearly marked so as to be identified with proper openings.

C. The General Contractor will be solely responsible for hardware when delivered on examination and receipt of same.

D. The wrapping on knobs, handles, putts, etc. shall be replaced upon hardware when installed and remain until building is completed.

1.09 GUARANTEE CLAUSE:

A. The successful Hardware Contractor shall be required to furnish all hardware under the following conditions:

"Subject to ordinary ware and tear as it pertains to particular installaions, we guarantee our products against defects in workmanship, operation or material specified. However, we assume no liability where faulty operation is due to either improper installation or failure to exercise normal maintenance".

1.10 KEYING:

A. All cylinders shall be subject to a 6-Pin Security Restricted Keyway Master Key and Grand Master Key for PWA, East Hartford, CT.

B. Two or more doors to an area including storage doors within the area shall be keyed alike. Furnish 4 keys each lock.

C. Additional keying as so directed by the Architect or Owner prior to approval of the Hardware Schedule. Furnish 5 Construction Keys.

2. PRODUCTS

2.01 MATERIAL AND FINISH:

A. All Hardware, except as noted, shall be Bronze metal with Satin Chrome Finish (US26D).

B. Toilet areas shall be Polished Chromium Finish (US26D).

C. Interior Butts Steel Plated Finish (US26D).

D. Door Closers and Closer Brackets shall be Silver Aluminum Lacquer Finish (SBL).

E. Kick Plates and Mop Plates, but not including Push and Pulls shall be Satin Stainless Steel (US32D).

2.02 BUTTS:

A. All Butts shall be manufactured by the Stanley Works and shall be button tipped with non-rising pins. Exterior door butts shall be furnished with stainless steel Non-Removable Pins.

B. Furnish 1-1/2 pair of Butts or Pivots for each door or 1 pair of Butts for every 2-1/2 feet of door height on larger doors over 7'0".

C. Butts shall be the size and weight as specified:
1. Pivot Reinforced Hinge:
CB1969 5 X 4-1/2 NRP extra heavy for exterior doors and doors 1, 2, 3, 5, 6, 27, 28, 29, 32, 33, 37, 44,
2. CB1900 4-1/2" high for all interior 1-3/4" doors.

2.03 LOCKS & LATCHSETS:

A. Locks and latches shall be heavy duty 5000 Series. Full 3/4" throw brass anti-friction latchbolt. (Govt. 86 Series).

B. Furnish all locks and Latches with box strikes.

C. Lock Guards - Precision Hardware #1620 - Exterior doors.
1. Russwin Lock Design 5045 Series - Dirke design.
2. Corbin Lock Design 9555 Series - 760-L Stratford.
3. For all Interior doors not listed:
a. #5025 - for doors 40 and 42.
b. #5059 - for doors 26, 38 and 39.
4. Knurled Lever Handles on all Storage, Jan. Stairs, Mech., Elec. and doors 26, 38, 39, 41 and 43.

2.04 FIRE EXIT BOLTS & MULLIONS:

A. Shall be Exiter - 700 Series.

B. Mortise Fire Exit Bolt 799A w/cylinder for doors 1 and 6.

C. Mortise Fire Exit Bolt 797 x Citation 888-L for door 2, 3, 5, 27 & Doors 29, 32, 33, 37 Exterior Access Key only.

2.05 KICK PLATES:

A. Kick Plates shall be 16" height and shall be 2" less than full width of door on all exterior doors, all public and private toilets and all doors with door closers for doors 1, 2, 3, 5, 27, 29, 32, 33, 37, 44, 28, 7, 9, 12, 16, 19, 21, 25, 14, 15, 17, 18, 26, 28, 39, 41, 43, 40 and 42.

2.06 DOOR CLOSERS:

A. Closers shall be the size and weight as recommended by the Hardware Manufacturers catalog.

B. Parallel Closer "Cush n Stop" shall be manufactured by LCN (No substitution) Series 4110-N Cush for all exterior doors and doors 1, 2, 3, 5, 6, 27, 29, 33, 32, 37, 44 and 28.

C. Door Closer shall be K2820 Series complete with case cover and independent backcheck valves. Furnish Parallel Arm to conceal closer from corridor or room view, public toilet doors and doors 7, 9, 12, 16, 19, 21, 25, 14, 15, 17, 18, 26, 38, 39, 41, 43, 40 and 42.

2.07 FLUSH BOLTS:

A. Bolt #458B - 12" long rods with Dust Proof Strike 487B x 489B for pairs of doors 28, 26, 38 and 39.

2.08 DOOR STOPS & HOLDERS:

A. Wall Bumpers 407 and 407-1/2 for all doors complete with concealed fastenings.

B. Floor Stops 436B or 438B for all doors regardless of degree of opening not listed with holders or bumper.

2.09 ALARM LOCKS:

A. Alarm Locks - Detex #EA-500 for doors 1 and 6.

2.10 SILENCERS:

A. Rubber type Silencers shall be furnished on all interior doors.

B. Single door bucks furnish 3 each and on pairs of door 2 each.

2.11 THRESHOLDS, WEATHERSTRIPPING & SWEEPS"

A. All Thresholds, Weatherstripping, etc., shall be furnished complete with necessary screws, lead expansion shields, drive nails and instructions for mounting.

B. Thresholds 655A with screws and lead expansion shields 1/2" high or as detailed on Architectural Drawings or Specification, such as exterior doors, stair hall doors etc.

C. Jamb & Head Weatherstripping #328D complete with screws, all exterior doors.

D. Bottom Door Sweeps #339D on all exterior door leaves with duranodic finish.

E. Surface Meeting Stile Astragals for pair doors #328MD in duranodic finish - both leaves.

F. Rain Drip #11B - 4" wider than door width - all exterior doors.

2.12 SCHEDULE:

A. The Finishing Hardware listed herein shall not be construed as a complete hardware schedule and shall only be considered as an indication of hardware requirements desired by the architect.

B. The Hardware Schedule shall contain a separate page stating the manufacturers name and catalog numbers of all items of hardware listed in the submitted hardware schedule.

C. Prior to award of this Contract, the successful Hardware Contractor shall submit to the Architect for approval within 30 days, 6 complete copies of his hardware schedule.

D. The Finish Hardware Schedule shall include adjacent to the item number, group hardware set number as appearing in the hardware specification.

DIVISION 8 - DOORS AND WINDOWS

SECTION 08800 - GLAZING

1. GENERAL

1.01 WORK INCLUDED

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to work specified in this Section.

B. Work by this Section includes but is not limited to:
   1. Glass and glass setting.
      a. Provide glass and glazing for all doors and windows.

1.02 RELATED WORK

A. Section 07900 - Sealants

B. Section 08100 - Custom Metal Doors and Frames

C. Section 08520 - Aluminum Windows

1.03 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies: Install glass and glazing to meet the requirements of the State of Connecticut Basic Building Code.

B. Reference Standards:
   1. American National Standards Institute
      a. ANSI Z97.1-1972, Performance Specifications and Methods of Test for Safety Glazing Material used in Buildings.
   2. Underwriter's Laboratory Incorporated
      a. UL Guide HOVR, Glazing for Fire Windows and Doors.

1.04 SUBMITTALS

A. Provide samples and product data in accordance with Section 01300, Submittals.

B. Manufacturer's Literature:
1. Manufacturer's description data of glass and glazing materials.
2. Recommended installation instructions.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Perform glazing when ambient temperature is above 40 degrees F.

B. Perform glazing on dry surfaces only.

2. PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Insulating and Tempered Glass
1. Cardinal IG
2. Ford
3. Guardian
4. Inde-Pane
5. Interpane
6. Libbey Owens Ford
7. P.P.G. Industries
8. Saint Gobain
9. Southwall Technology
10. Spectrum
11. Viracon
12. Tempglass

B. U.L. Rated Glass
1. 1/4 inch square grid wire glass.

2.02 MATERIALS

A. Glass for all U.L. "B" and "A" Label Doors and Frames amd Unrated Doors and Frames: Wire glass - square grid
1. Thickness: 1/4"
2. Approvals: Underwriters Laboratories and Warnock Hersey International

B. Insulating Glass:
1. Tinted insulating glass units formed of two pieces of glass separated by 5/8" dehydrated air space hermetically sealed. Inner light shall be Clear Float Glass, Fed. Spec. DD-G-451, Type I, Class 1, Quality 93, 3/16" thick with low "E" coating (low emissivity glass) on the inner face. Outer light shall be light reducing tinted glass, Type 1, Class 3, quality 93, 3/16" thick, bronze color.

2.03 SEALANT

A. One part silicone rubber, FS TT-S-001543, non-sag type, Class A.

2.04 ACCESSORIES

A. Setting Blocks: Neoprene, 70-90 Shore "A" durometer hardness, chemically compatible with sealant used.

B. Spacers: Neoprene, 40-50 Shore "A" durometer hardness, chemically compatible with sealant used.

C. Filler Rod: Compressible synthetic rubber or foam, chemically compatible with sealant used.

D. Primer-Sealers and Cleaners: As recommended by glass and sealant manufacturer.

2.05 COMPATIBILITY

A. All components of glazing system must be compatible.

3. EXECUTION

3.01 INSPECTION

A. Check that glazing channels are free of burrs, irregularities, and debris.

B. Check that glass is free of edge damage or face imperfections.

C. Do not proceed with installation until conditions are satisfactory.

3.02 PREPARATION

A. Field Measurements
   1. Measure size of frame to receive glass.
   2. Compute actual glass size, allowing for edge clearances.

B. Preparation of Surfaces
   1. Remove protective coatings from surfaces to be glazed.
   2. Clean glass and glazing surfaces, to remove dust, oil and contaminants, and wipe dry.

3.03 INSTALLATION

A. Apply primer-sealer to joint surfaces as recommended by sealant and glass manufacturer.

B. Do not cut, seam, nip, or abrade tempered glass.

C. Glazing in interior doors and windows and exterior doors
   1. Use glazing tape, both sides, use pre shimed tape for one side.
   2. Exterior doors: provide exterior cap bead over glazing tape.

D. Glazing in Aluminum Windows:
   1. Cut pre shimed glazing tape to length and set against permanent stops.
   2. Install horizontal strips first, extending over width of opening, before applying vertical strips. Seal butt joints of tape with sealant.
   3. Place setting blocks at quarter points.
   4. Remove paper backing from tape.
   5. Position glass on setting blocks and press against tape for full contact.
   6. Place preshimed glazing tape on free perimeter of glass.
   7. Seal butt joints of tape with joint sealant.
   8. Install removable stop, avoiding displacement of tape, and exert pressure on tape for full continuous contact.
   9. Apply cap bead of sealant, both sides.
   10. Manufacturers standard dry gasket system may be used in place of above.

3.04 CLEANING

A. Remove excess glazing compound from installed glass.

B. Remove labels from glass surface as soon as installed.

C. Wash and polish both faces of glass.

D. Remove debris from Work site.

END OF SECTION

DIVISION 9 - FINISHES

SECTION 09275 - REINFORCED SYNTHETIC STUCCO (EIF EXTERIOR INSULATION AND FINISH)

1. GENERAL

1.01 SCOPE

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to work specified in this Section.

B. Work by this Section includes but is not limited to:
   1. Synthetic Stucco Exterior Soffit complete with gypsum sheathing and metal support system.

1.02 QUALITY ASSURANCE

A. Acceptable Manufacturers
   1. Dryvit Systems, Inc.
   2. Sto Systems, Division of LDA Incorporated

B. Manufacturers names are provided in order to indicate the quality, pattern and characteristics of the product. Other manufacturers products which in the opinion of the Architect, are equal in quality, pattern and characteristics will be acceptable.

C. Qualifications of Installer
   1. Minimum of three project installations of comparable extent as proposed project.

1.03 SUBMITTALS

A. Provide product data and samples in accordance with Section 01300, Submittals.

B. Manufacturer's literature.

C. Samples: 6" x 6" complete system for color approval.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver materials in original, unopened protective packaging, with manufacturer's labels.

B. Store materials in original protective packaging to prevent soiling, physical damage or wetting.

1.05 ENVIORNMENTAL CONDITIONS

A. Installation shall be done only when environmental conditions recommended by the manufacturer exist.

2. PRODUCTS

2.01 MATERIALS

A. Metal Framing: 16 ga. galvanized 3-5/8" metal studs and runners.

B. Gypsum Board: 1/2" exterior sheathing.

C. Insulation Board: Rigid expanded polystyrene, thickness as indicated on drawings.

D. Reinforcing Fabric: Manufacturer's standard.

E. Adhesive: Plaster material mixed with Portland Cement.

F. Finish: Synthetic plaster with integral color and high bond strength.

3. EXECUTION

3.01 PROTECTION

A. Protect adjacent finish surfaces by masking and taping.

3.02 INSTALLATION

A. Install metal framing in accordance with GA 201 & GA 216.

B. Screw sheathing to metal furring 8" o.c. along each framing members.

C. Apply insulation board to substrate gypsum sheathing with adhesive.

D. Imbed reinforcing material in adhesive coating over insulation.

E. Trowel on finish surface and float to light sand texture.

3.03 CLEAN UP

A. Clean up stains and remove excess material and debris from job.

END OF SECTION

DIVISION 9 - FINISHES

SECTION 09310 - CERAMIC TILE

1. GENERAL

1.01 SCOPE

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to work specified in this Section.

B. Work by this Section includes but is not limited to:
1. Ceramic tile, flooring installed using mud set method with cementitous grouted joints.
2. Marble thresholds in door openings.

1.02 RELATED WORK

A. Section 04200 - Unit Masonry

1.03 REFERENCE STANDARDS

A. ANSI A108.1 - Ceramic Tile Installed with Portland Cement Mortar.

B. TCA137.1 - Recommended Standard Specifications for Ceramic Tile.

C. Tile Council of America - Handbook for Ceramic Tile Installation.

1.04 SAMPLES

A. Provide submittals in accordance with Section 01300, Submittals.

B. Submit samples of ceramic wall and floor tile manufacturers complete color and texture range equal to American Olean.

1.05 ENVIRONMENTAL CONDITIONS

A. Provide sufficient heat and ventilation in areas where work of this section is being performed, so as to allow ceramic tile to properly set. Take all precautionary measures necessary to ensure that excessive temperature changes do not occur.

1.06 QUALITY CONTROL

A. Inform Architect 1 week before beginning tile work and arrange an on site meeting to discuss tile layout and jointing. In preparation for meeting measure rooms and be prepared to discuss layout and joint alignment.

2. PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. American Olean Tile.

B. Dallas Ceramic Tile Co.

C. Mid State.

D. Summitville.

2.02 TILE

A. Conforming to TCA 137.1.
   1. Standard Grade.

B. Unglazed Floor and Base Tile.
   1. Ceramic Mosaic.
      a. Flat tile
         1) Nominal Size: 2" x 2" x 1/4".
         2) Color: Base and Floor - to be selected from color selection equal to American Olean Groups 1, 2, and 3.
         3) Edge: Cushion Cut.

2.03 MARBLE THRESHOLDS

A. White Honed Italian Marble.

B. Grade A, First Quality.

C. Free from cracks, chips, stains or defects.

D. Double bevel 1/4" each side, overall thickness above finished floor shall not exceed 1/4".

E. Thickness as required for floor thickness.

2.04 SETTING MATERIALS F112-90

A. Portland Cement - ASTM C150, Type 1.

B. Sand - ASTM C-144.

C. Water potable.

D. Mortar - 1 part cement, 6 parts damp sand by Volume.

E. Bond Coat - Portland Cement Paste.

2.05 GROUTING MATERIALS

A. Latex Portland Cement Grout.

3. EXECUTION

3.01 INSPECTION AND PREPARATION

A. Examine surfaces to receive ceramic tile, setting beds, or accessories before tile installation begins for:
   1. Defects or conditions adversely affecting quality and execution of tile installation.
   2. Deviations beyond allowable tolerance of surfaces to receive tile.

B. Do not proceed with installation Work until unsatisfactory conditions are corrected.

C. Condition of surface to receive tile:
   1. Surface to be firm, dry, clean and free of oily or waxy films.
   2. Grounds, anchors, plugs, hangers, bucks, electrical and mechanical work in or behind tile to be installed prior to proceeding with tile Work.

3.02 INSTALLATION

A. Ceramic Tile:
   1. Conventional Portland Cement mortar: ANSI A108.1.

B. Floor Tile:
   1. Mud Set: Install in accordance with Tile Council of America Specification F112-90.

C. Place tile in accordance with patterns on drawings. Carefully plan tile layouts.

D. Neatly cut tile around fixtures and drains. Accurately form corners, base, intersections and returns.

E. Ensure tile joints are uniform in width, subject to normal variance in tolerance allowed in tile size. Ensure joints are watertight, without voids, cracks, excess mortar or grout.

F. Sound tile after setting. Remove and replace hollow sounding units.

G. Allow tile to set for a minimum of 48 hours prior to grouting.

H. Completed installation to be free of broken, damaged or faulty tile.

END OF SECTION

DIVISION 9 - FINISHES

SECTION 09510 - ACOUSTICAL CEILINGS

1. GENERAL

1.01 SCOPE

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to work specified in this Section.

B. Work by this Section includes but is not limited to:
   1. Non-fire rated metal grid and attached systems complete with wall angles and trim.
   2. Ceiling tiles and boards.
   3. Accessories.

1.02 RELATED WORK

A. Division 15000 - Mechanical Specification Sections

B. Division 16000 - Electrical Specification Sections

1.03 QUALITY ASSURANCE

A. Acceptable manufacturers: Suspension system types and acoustical tile patterns are specified by manufacturer. Products of equal performance, construction, operation and appearance by the following manufacturers will be acceptable. Suspension system and acoustical tile shall match in color and shall be from one source except at Tectum ceilings.
   1. Suspension Systems:
      a. Chicago Metallic Corporation
      b. Donn Products, Inc.
      c. National Rolling Mills, Inc.
   2. Suspension System and Acoustical Tile:
      a. Armstrong
      b. Celotex
      c. Tectum

B. Qualifications of Installer:
   1. Minimum of three project installations of comparable extent as proposed project.
   2. Submit written description of material installer, listing name of material manufacturers, qualifications of installation personnel, and years of concurrent contracting experience.

C. Tolerances:
1. Surfaces to receive acoustical treatment: Free from irregularities and level to within 1/4" in 12 feet.
2. Deflection:
a. Suspension system components, hangers, and fastening devices supporting light fixtures, ceiling grilles, and acoustical units: maximum deflection 1/360 of the span.
b. Deflection test: ASTM C635-76.
3. Allowable tolerance of finished acoustical ceiling system: Level within 1/8 inch in 12 feet.

1.04 SUBMITTALS

A. Provide submittals in accordance with Section 01300, Submittals.

B. Samples:
1. Submit one 4" x 4" sample of each type of acoustical material to illustrate color and range of appearance and edge conditions.
2. Submit one full size sample of each suspension system member, moldings and hangers.

C. Manufacturer's Literature: Submit for review by the Architect the manufacturer's recommendation for installation of suspension system.

D. Maintenance Material:
1. Furnish extra materials equal to 2% of each type of acoustical ceiling material supplied.
2. Furnish suspension system components in amount sufficient to install extra ceiling tiles.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver materials in original, unopened, protective packaging, with manufacturer's labels indicating brand name, pattern, size, thickness and fire rating as applicable, legible and intact.

B. Store materials in original protective packaging to prevent soiling, physical damage or wetting.

C. Store cartons open at each end to stabilize moisture content and temperature.

D. Do not begin installation until sufficient materials to complete a room are received.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Complete installation of dampening materials before beginning work.

B. Maintain humidity of 65% - 75% in area where acoustical materials are to be installed, 25 hours before, during and 25 hours after the installation.

C. Maintain a uniform temperature in the range of 55 degrees F to 70 degrees F prior to and during installation of materials.

2. PRODUCTS

2.01 MATERIALS

A. Acoustical Units:
1. Armstrong Angled Tegular Cirrus 584.
2. Size: 24" x 24" x 3/4"
3. Fed. Spec. SS-S-118B
4. Flame Spread: 0-25 Class A
5. Edge: Tegular Layin
6. NRC: .55 - .65
7. STC: 35 - 39
8. Light Reflection: LR 1
9. Thermal Resistance R: 1.5

B. Suspension System
1. Armstrong Prelude Exposed Tee Grid
2. ASTM C635
3. 28 ga. Electro Galvanized
4. Color: Low-Sheen satin white
5. Face Dimension: 15/16"
6. Classification: Intermediate
7. Wall Molding: Edge angle match grid at 15/16" width.
8. Positive interlock end detail (stab in detail).

2.02 ANCHORS, HANGERS, SUPPORTS

A. Provide manufacturer's standard anchors for securing hanger wires to metal deck and structural steel beams and joists.

B. Hanger wire to be 12 gauge.

C. Column Enclosures: Fry PRM-75.75

3. EXECUTION

3.01 CONDITION OF SURFACES

A. Examine surfaces scheduled to receive suspended or directly attached acoustical units for unevenness, irregularities, and dampness that would affect quality and execution of work. Patch substrate and repair as required to provide proper bearing for new ceiling attachment.

3.02 INSTALLATION

A. Suspension System: In conformance with ASTM C636-76 and ASTM -E 380 with full seismic protection.

B. Rough Suspension:
1. Hangers:
   a. hanger clips or inserts: Installed as recommended by manufacturer.
   b. Space hanger wires 4 ft. o.c., each direction.
   c. Install additional hangers at ends of each suspension member at light fixtures, 6" from vertical surfaces.
   d. Do not splay wires more than 5" in a 4 ft. vertical drop.
   e. Wrap wire a minimum of three times horizontally, turning ends upward.
   f. Provide proper suspension and anchorage to meet code requirements for seismic forces.
   g. Provide additional bracing every 144 S.F.
2. Saddle tie carrying channels to main structure for indirect hung suspension system.
3. Main and cross runners:
   a. Space main runners according to manufacturer's requirements, at right angle to carrying channel.
      1) Level and square to adjacent walls.
      2) Wire clip to channels at all intersections.

b. Space cross runners according to manufacturer's requirements.

4. Wall molding:
   a. Install wall molding at intersection of suspended ceiling and vertical surfaces.
   b. Miter corners where wall moldings intersect or install corner caps.
   c. Attach to vertical surface with mechanical fasteners.
   d. Install spring spacers to wall molding to hold acoustical unit snug on flange or wall molding.

C. Acoustical Units:
   1. Install in level plane in straight line courses.
   2. Place materials to bear all around on suspension members.
   3. Minimum width of border tiles: one-half unit dimension.
   4. Seal joints in acoustical units around pipes, ducts, and electrical outlets with caulking compound.

3.03 CLEANING

A. Clean soiled or discolored unit surfaces after installation.

B. Touch up scratches, abrasions, voids, and other defects in painted surfaces.

C. Remove and replace damaged or improperly installed units.

END OF SECTION

DIVISION 9 - FINISHES

SECTION 09650 - RESILIENT FLOORING

1. GENERAL

1.01 SCOPE

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to work specified in this Section.

B. work by this Section includes but is not limited to:
1. Resilient flooring.
2. Resilient base.

1.02 REFERENCES

A. ASTM E84 - Surface Burings Characteristics of Building Materials.

B. FS SS-T-312 - Tile, Floor: Asphalt, Rubber, Vinyl, Vinyl Composition.

C. FS-SS-W-40 - Wall Base: Rubber and Vinyl Plastic.

1.03 REGULATORY REQUIREMENTS

A. Conform to applicable code for flame/fuel/smoke rating requirements in accordance with ASTM E84.

1.04 SUBMITTALS

A. Provide product data and manufacturers instructions in accordance with Section 01300, Submittals.

B. Provide product data on specified products, describing physical characteristics, sizes, patterns and colors available.

C. Submit manufacturer's installation instructions under provisions of Section 01300.

1.05 ENVIRONMENTAL REQUIREMENTS

A. Store materials for three days prior to installation in area of installation to achieve temperature stability.

B. Maintain ambient temperature required by adhesive manufacturer three days prior to, during, and 24 hours after installation of materials.

1.06 EXTRA MATERIALS

A. Provide 20 sq. ft. of flooring and 30 lineal feet of base materials of each material specified.

2. PRODUCTS

2.01 MANUFACTURERS - VINYL COMPOSITION TILE

A. Kentile

B. Armstrong

C. Azroch

D. Dynamit Nobel of America

2.02 VINYL COMPOSITION TILE

A. Conforming to FS-SS-T-312, Type IV, mottled 12 x 12 inch by 1/8 inch thick, color to be selected by Architect from full line.

2.03 BASE MATERIALS

A. Base: Rubber; top set coved, 4 inch high, 1/8" thick including premolded end stop and external corners, color to be selected by Architect from manufacturer's full line.

2.05 ACCESSORIES

A. Subfloor Filler: White premix latex; type recommended by flooring material manufacturer.

B. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer.

C. Sealer and Wax: Types recommended by flooring manufacturer.

3. EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are smooth and flat with maximum variation of 1/8 inch in 10 ft. and are ready to receive Work.

B. Verify concrete floors are dry to a maximum moisture content of 7 percent, and exhibit negative alkalinity, carbonization, or dusting.

C. Beginning of installation means acceptance of existing substrate and site conditions.

3.02 PREPARATION

A. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with subfloor filler.

B. Apply, trowel, and float filler to leave a smooth, flat, hard surface.

C. Prohibit traffic from area until filler is cured.

D. Vacuum clean substrate.

E. Apply primer to surfaces as recommended by material manufacturer.

3.03 INSTALLATION - MATERIAL

A. Install in accordance with manufacturer's instructions.

B. Mix tile from container to ensure shade variations are consistent.

C. Spread only enough adhesive to permit installation of materials before initial set.

D. Set flooring in place, press with heavy roller to attain full adhesion.

E. Lay flooring with joints and seams parallel to building lines to produce symmetrical tile patterns.

F. Install tile to square grid pattern with all joints aligned with pattern grain parallel for all units and parallel to length of room with inset pattern shown. Allow minimum 1/2 full size tile width at room or areas perimeter.

G. Terminate flooring at face of wall at door openings where adjacent floor finish is dissimilar.

H. Install edge strips at unprotected or exposed edges, and where flooring terminates.

I. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.04 INSTALLATION - BASE MATERIAL

A. Fit joints tight and vertical. Maintain minimum measurement of 18 inches between joints.

B. Miter internal corners. At external corners, use premolded corners. At exposed ends use premolded units.

C. Install base on solid backing. Bond tight to wall and floor surfaces.

D. Scribe and fit to door frames and other interruptions.

3.05 PROTECTION

A. Prohibit traffic on floor finish for 48 hours after installation.

3.06 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean, seal, and wax floor and base surfaces in accordance with manufacturer's instructions.

END OF SECTION

DIVISION 9 - FINISHES

SECTION 09900 - PAINTING

1. GENERAL

1.01 SCOPE

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to work specified in this Section.

B. work by this Section includes but is not limited to:
1. Preparation and painting of all interior and exterior Work including structural steel, joists, metal deck, metal trim, miscellaneous metals, doors, frames, piping equipment and interior masonry.

1.02 RELATED WORK

A. Section 04200 - Unit Masonry

B. Section 05500 - Metal Fabrications

C. Section 08100 - Custom Metal Doors and Frames

D. Section 08331 - Overhead Coiling Doors

E. Section 09950 - Protective Coatings

1.03 REFERENCES

A. ANSI/ASTM D16 - Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.

B. ASTM D2016 - Test Method for Moisture Content of Wood.

1.04 DEFINITIONS

A. Conform to ANSI/ASTM D16 for interpretation of terms used in this Section.

1.05 QUALITY ASSURANCE

A. Product Manufacturer: Company specializing in manufacturing quality paint and finish products with three years experience.

B. Applicator: Company specializing in commercial painting and finishing with three years experience.

1.06 REGULATORY REQUIREMENTS

A. Conform to applicable code for flame/fuel/smoke rating requirements for finishes.

1.07 SUBMITTALS

A. Submittals shall be in accordance with Section 01300, Submittals.

B. Submit product data.

C. Provide product data on all finishing products.

D. Submit manufacturer's application instructions.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site under provisions of General Conditions.

B. Store and protect products under provisions of General Conditions.

C. Deliver products to site in sealed and labelled containers; inspect to verify acceptance.

D. Container labeling to include manufacturer's name, type of paint, brand name, brand code, coverage, surface preparation, drying time, clean up, color designation, and instructions for mixing and reducing.

E. Store paint materials at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in well ventilated area, unless required otherwise by manufacturer's instructions.

F. Take precautionary measures to prevent fire hazards and spontaneous combustion.

1.09 ENVIRONMENTAL REQUIREMENTS

A. Provide continuous ventilation and heating facilities to maintain surfaces and ambient temperature above 45 degrees F for 24 hours before, during, and 48 hours after application of finishes, unless required otherwise by manufacturer's instructions.

B. Do not apply exterior coatings during rain or snow, when relative humidity is above 50 percent, unless required otherwise by manufacturer's instructions.

C. Minimum Application Temperature for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.

D. Minimum Application Temperature for Varnish Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.

E. Provide lighting level of 80 ft. candles measured mid-height at substrate surface.

F. Protection:
1. Cover or otherwise protect finish work of other trades and surfaces not being painted concurrently or not to be painted.

1.10 EXTRA STOCK

A. Provide a one gallon container of each color of each type finish paint to Owner. Do not provide extra stock of primers.

B. Label each container with color and room locations, in addition to the manufacturer's label.

2. PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Except as otherwise specified, materials shall be the products of the following manufacturers:
1. DeVoe & Reynolds
2. Olympic
3. PPG Industries
4. Benjamin Moore Co.
5. Pratt & Lambert
6. Sherwin Williams
7. Tnemec
8. Glidden

B. Materials selected for coating systems for each type surface shall be the product of a single manufacturer.

2.02 MATERIALS

A. Products are specified with manufacturers names, equal products of other acceptable manufacturers listed in Article 2.1 may be furnished in lieu of those listed.

B. Coatings: Ready mixed, except field catalyzed coatings. Process pigments to a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating.

C. Coatings: Good flow and brushing properties; capable of drying or curing free of streaks and sags.

D. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified, of commercial quality.

2.03 FINISHES

A. Refer to schedule at end of Section for surface finish schedule.

3. EXECUTION

3.01 INSPECTION

A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

3.02 PREPARATION

A. Remove electrical plates, hardware, light fixture trim, and fittings prior to preparing surfaces or finishing.

B. Correct minor defects and clean surfaces which affect work of this Section.

C. Shellac and seal marks which may bleed through surface finishes.

D. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

E. Uncoated Steel and Iron Surfaces: Remove grease, scale, dirt, and rust. Where heavy coatings of scale are evident, remove by wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Spot prime paint after repairs.

F. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Prime metal items including shop primed items.

G. Metal Doors Scheduled for Painting: Paint top and bottom edges with primer.

H. Unprimed Galvanized Steel:
1. Remove obvious deposits of grease and oil.
2. Flood with white vinegar, wet entire surface, let stand for five minutes, repeat three times.
3. Remove vinegar residue with clean rags and clean water.
4. Dry surfaces with clean rags.
5. Clean entire surface by flooding with clear mineral spirits and wiping dry with clean cloths, repeat one more time.
6. Apply etching primer.

3.03 PROTECTION

A. Protect elements surrounding the work of this Section from damage or disfiguration.

B. Repair damage to other surfaces caused by work of this Section.

C. Furnish drop cloths, shields, and protective methods to prevent spray or droppings from disfiguring other surfaces.

D. Remove empty paint containers from site.

3.04 APPLICATION

A. Apply products in accordance with manufacturer's instructions.

B. Do not apply finishes to surfaces that are not dry.

C. Apply each coat to uniform finish.

D. Apply each coat to paint slightly darker than preceding coat unless otherwise approved.

E. Sand lightly between coats to achieve required finish.

F. Allow applied coat to dry before next coat is applied.

3.05 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

A. Refer to Division 15 and Division 16 for schedule of color coding and identification banding of equipment, ductwork, piping, and conduit.

B. Prime and paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, except where items are prefinished. Paint all factory painted mechanical equipment interior and exterior.

C. Replace identification markings on mechanical or electrical equipment when painted accidentally.

D. Paint exposed conduit and electrical equipment.

E. Paint backs of plywood back boards before installation. Paint face and edges of plywood backboards of electrical and telephone equipment before installing equipment.

F. Color code concealed and exposed equipment, piping, conduit, and ductwork as directed in the field. Color band and identify with flow arrows and names.

G. Replace electrical plates, hardware, light fixture trim, and fittings; remove prior to finishing.

3.06 CLEANING

A. As Work proceeds, promptly remove paint where spilled, splashed, or spattered.

B. During progress of Work maintain premises free of unnecessary accumulation of tools, equipment, surplus materials, and debris.

C. Collect cotton waste, cloths, and material which may constitute a fire hazard, place in closed metal containers and remove daily from site.

3.07 PAINT SCHEDULE

Paints are scheduled with manufacturers names, equal materials from other listed manufacturers are acceptable.

A. Exterior and Interior Galvanized Metal: (Gloss)
   1. Primer: Tnemec - 66-1211 Epoxoline primer
      1 coat
   2. Intermediate: Tnemec Series 66 - High Build Epoxoline
      1 coat
   3. Finish: Tnemec - Series 70 Endura-Shield
      Aliphatic Polyester Polyurethane Enamel
      2 coats

B. Exterior and Interior Ferrous Metals: (Gloss)
   1. Primer: Tnemec - 90-93 Tnemezinc, organic epoxy
      1 coat
   2. Intermediate: Tnemec Series 66 High-Build Epoxoline
      1 coat
   3. Finish: Tnemec - Series 70 Endura Shield
      Aliphatic Polyester Polyurethane Enamel
      2 coats

C. Interior Concrete Masonry Units except where noted for Protective Coatings.
   1. Primer: (Pittsburgh) Pitt-Glaze Water Base Acrylic Epoxy Block Filler.
      1 coat
   2. Finish: Pittsburgh Pitt-Glaze - Low Odor - High Solids Water Base Acrylic - Epoxy Coating - Semi Gloss.
      2 coats

NOTE: Primer may be deleted on previously primed surfaces if prime coat is intact. If prime coat is scratched, worn or abraded prepare and prime individual areas before applying finish.

3.08 COLORS

A. Colors are to be selected by the Architect.

END OF SECTION

DIVISION 9 - FINISHES

SECTION 09950 - PROTECTIVE COATINGS

1.0 GENERAL

1.01 SCOPE

A. Preparation of floor, wall, curbing, truckwell, and sump surfaces throughout the facility (includes all surfaces within the containment areas, plus the top surfaces of all curbing), to an elevation of 44.75 feet except Rooms 8, 9, 10, 12, and 13.

B. Application of chemically resistant coating to all the surfaces defined in Paragraph A above.

C. Concrete floors and all other horizontal surfaces coated with chemical resistant floor topping.

D. Vertical concrete surfaces coated with chemical resistant coating system including filler-sealer.

E. Steel surfaces provided as part of the concrete areas defined in C and D above, including but not limited to stairs, trench and sump corner and edge protectors.

F. Traffic and safety striping in areas defined in Paragraph A above as designated by owner.

G. Work under this section is affected by Bid Alternate E. See Fixed Price Proposal.

1.02 QUALITY ASSURANCE

A. Coatings are to be first quality "top of the line" products by national brand name manufacturer producing type of materials used for not less than 10 years. Materials shall be from one source unless otherwise approved.

B. Applicator shall be an authorized representative of the materials manufacturer or an applicator approved by the Owner and the materials manufacturer.

C. A representative of the materials manufacturer shall be on the job site before and during the start of the application for consultation and to inspect the surfaces to which the materials are being applied and the manner in which materials are being applied.

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's technical information including coating label analysis and application instructions for each coat of each finish.

1.04 DELIVERY AND STORAGE

A. Deliver materials to job site in original, new and unopened packages and containers bearing manufacturer's name and label, and following information:

1. Name or title of material.
2. Fed. Spec. number, if applicable.
3. Manufacturer's stock number and date of manufacturer.
4. Manufacturer's name.
5. Contents by volume, for major pigment and vehicle constituents.
6. Thinning instructions.
7. Application instructions.
8. Color name and number.

B. Store materials in tightly covered containers when not in use. Protect from freezing where necessary. Keep storage area neat and orderly.

1.05 MANUFACTURERS

A. All materials specified herein are as manufactured by Master Builders or Wisconsin Protective Coatings. Like products by other manufacturers may be used upon submission to, and approval by United.

2.0 PRODUCTS

2.01 COATING MATERIALS

A. On masonry and vertical concrete surfaces, coating material shall be Plasite 9028M1 filler/sealer and Plasite 4300 chemical resistent Protective Coating, or Flakeline 232.

B. On steel surfaces,coating material shall be Plasite 4300 or Flakeline 232. No filler/sealer is required.

C. On concrete floor and other horizontal surfaces, coating material shall be Plasite 5602 5-ply laminated system or Poly Plus 163 system of vinyl ester resin and chemically resistant aggregate.

D. Horizontal construction joint sealant shall be DOW Corning 888SL self leveling silicone joint sealant, Concresive 1064 or equivalent approved by United.

E. All materials shall be of first quality.

3.0 EXECUTION

3.01 SURFACE PREPARATION

A. GENERAL

1. Before proceeding with the Protective Coating work, the coating manufacturer's representative is to inspect the various areas to receive coatings and to make recommendations if required for surface preparation, and approve surfaces for application of the new coating material.

B. VERTICAL MASONRY AND CONCRETE SURFACES

1. Inspect for structural failures, cracks, protrusions and fins. Grind surface flush and grind cracks to 'V' configuration. Chip out all loose concrete to width of 1/4" minimum.

2. Repair all large holes, cracks, voids and other imperfections with Plasite 9028M1 filler/sealer with addition of sand, as required, to provide proper stiffness. Mixtures up to equal parts of sand to resin may be used. A clean washed silica sand shall be used with an approximate U.S. Sieve size (percent retained on screen) of:

MESH SIZE	40	50	70	100
WT. % RETAINED	3%	31%	43%	19%

3. Concrete surface must have minimum 30 days cure, be clean, hard, dense, neutral and free of laitance, form oil and release agents. Blow holes, pits and cavities must be open in order that they may be properly filled and sealed. To provide the foregoing requirements, it is necessary to prepare the surface by the method listed:

a. Whip blast with a fine grade of sand, reducing the normal nozzle pressures. Pressure and distance of nozzle from surface depends on characteristic of concrete.

4. Before applying the filler/sealer, a simple moisture test shall be performed to verify that the concrete is fully cured. A 2 foot x 2 foot square plastic sheet shall be taped flush to the concrete floor. The tape shall form a continuous seal along the outer perimeter of the plastic sheet. After 24 hours the plastic sheet shall be removed. If the underlying concrete is damp or if there is moisture on the underside of the plastic sheet, the concrete is not yet fully cured. In this event, the coating shall not be applied.

C. STEEL SURFACES

1. All sharp edges shall be ground to produce a radius, and all imperfections, such as, skip welds, delaminations, scabs, slivers and slag shall be corrected prior to abrasive blasting. Skip welds shall be welded solid.

2. Degrease surface prior to sandblasting. Organic solvents, alkaline solutions, steam, hot water with detergents or other systems that will completely remove dirt, oil, grease, etc. may be used.

3. The surface shall be blasted to white metal (Steel Structure Painting Council Specification No. SP-5 or National Association of Corrosion Engineers Standard TM-01-70 No. 1). Use a 5/16" or 3/8" blast nozzle supplied with 80 to 100 psi. An anchor pattern or "tooth" in the metal shall correspond to approximately 20 to 25% of the total film thickness of the coating (1.6 to 2.5 mils).

4. Contaminated grit shall not be used for the finish work.

5. The grit used shall be a sharp silica sand, steel slag grit similar or equal to Black Beauty BB-1040, steel grit HG-25 or flint abrasive #7S (6-30 mesh).

6. Further reference may be made to National Association of Corrosion Engineers (NACE) Standard TM-01-70 No. 1. The anchor pattern shall be sharp and with depth as described in Section 3.01-C-3.

7. Remove all traces of grit and dust with a vacuum cleaner or by brushing. Care must be taken to avoid contaminating the surface with fingerprints or from detrimental material on the worker's clothes.

8. The surface temperature shall be maintained at a minimum of 5° above the dew point to prevent oxidation of the surface. The coating shall be applied within the same day that the surface has been prepared. Visible oxidation or condensation is not allowed.

D. HORIZONTAL CONCRETE SURFACE PREPARATION

1. Remove all existing surface imperfections, and any loose concrete down to sound concrete.

2. Surface preparation shall be one of the following:

   a. Abrasive blasting.

      - Sandblast with fine sand. Use a reduced pressure to produce a profile in the concrete to a texture of rough sandpaper.

   b. Shot blasting.

      - Shot blast with steel shot. Use a reduced pressure to produce a profile in the concrete to a texture of rough sandpaper.

   c. Scarifying.

      - Mechanical preparation using equipment available from Tennant Co. or MacDonald Air Tool Co. Scarifying equipment specifications and performance data shall be submitted to the coating manufacturers representative and United for approval.

3. Grouting

   a. Establish pitch and radius at vertical/horizontal intersections using grout.

      - Grouting material must be compatible with floor topping.

      - Grouting procedure to be submitted to and approved by owner prior to grouting.

4. Expansion Joints

a. Expansion joints at slab perimeter shall be provided with self leveling joint sealant above 1/2" expansion joint material.

3.02 APPLICATION CONDITIONS

A. All surfaces must be thoroughly cured,dry and clean before the coating is applied. A minimum air and floor surface temperature recommended by the manufacturer must be maintained on a 24-hour basis during application and for a minimum period of seven (7) days afterward. Keep areas to be coated free of traffic during application. Provide adequate heat, light, and ventilation.

3.03 APPLICATION

A. VERTICAL SURFACES

1. The applicator shall mask and/or otherwise protect other finishes and the work of other trades from damage due to his operations.

2. Apply all materials in full accordance with manufacturer's specification and instructions.

3. All masonry and concrete surfaces structure shall receive two coats of Plasite No. 9028M1 filler/sealer followed by two to three multi-pass spray coats of Plasite No. 4300 protective coating to a nominal thickness of 40 mils (35 mils minimum to 45 mils maximum). The filler/sealer shall not be thinned. Both filler/sealer coats shall be applied using a squeegee. An equivalent procedure for Master Builders Flakeline 232 system is acceptable.

a. Coating is supplied in 5-gallon and 1-gallon kits. A kit consists of 3 containers identified as PART I, PART II, PART III. In a 1-gallon kit, PART I and PART II are supplied in gallon cans with a small container of PART III catalyst. A 5-gallon kit is supplied in two 5-gallon containers with a small container of catalyst.

b. Airless or conventional atomizing spray shall be used for applying the protective coating. For airless spraying, use GRACO Bulldog or equivalent having a capacity of 3 gallons per minute. A tip size with .026 orifice or larger with a 12" minimum spray pattern. All screens should be removed from pump and gun. A 3/8" diameter fluid line is recommended with a

liquid pressure of 1600 to 1800 psig. For conventional spray, use a BINKS No. 18 gun with a No. 251 air cap and No. 59ASS fluid tip or equivalent. An alternate BINKS nozzle set-up would be a No. 261 air cap and No. 59BSS fluid tip. A heavy duty trigger spring is required with gun. The atomization pressure should be adjusted to 60# with a pot pressure of 50#.

c. Do not allow substrate or air temperature to be below the minimum temperature for curing as recommended by the manufacturer. The temperatures required shall be held until coating surface is tack free. The time required to obtain this "non-tacky" condition will be decreased as surface temperature increases. When surface temperatures are over 100°F, consult the manufacturer instructions.

d. Thinners can be used to adjust coating for various application conditions.

e. PARTS I and II shall be mixed with a motorized agitator driven by air or an explosion-proof motor. The Gray colored powder (PART II) shall be slowly added so that it does not leave lumps in the resin (PART I). PART I and PART II will require approximately 30 minutes of thorough mixing to be properly blended. PART III shall then be added with power agitation.

Mixing can be expedited by the blending of PART I and PART II 16 to 24 hours in advance of application. The mixture of PART I and PART II must be used within 7 days. PART III (the catalyst) can then be added and thoroughly mixed into the solution just prior to application. The pot life after mixing varies from 1 to 2 hours depending upon MATERIAL temperature. Do not divide parts or add new mixtures to old. Continuous mixing during use is required.

f. The coating shall be brush applied to all welds and seams. The technique for brushing shall be to brush out and not to flow on the coating.

g. The mixed coating shall be applied utilizing a multi-pass spray system. Apply horizontal and vertical passes with 50% overlap. The total wet mils per coat shall be approximately 24 mils, resulting in a dry film thickness of 18 to 22 mils. Special precautions are required at overlaps and welds to

eliminate excessive film build. Spray gun should be perpendicular to surface at all times, approximately 14" from surface.

h. Coating may be overcoated after initial "set", which will occur normally in 3 to 6 hours at 70°F with proper ventilation. Initial "set" time will decrease as surface temperature increases. When physical contact (foot traffic, scaffolding, etc.) with the previously applied coating is required, a minimum of 10 hours at 70°F substrate and air temperature with ventilation is normally required before proceeding. Previously applied coats must have reached a "non-tacky" state before being exposed to physical contact. This condition will occur in less time as surface temperature increases. NOTE: Previously applied coating exposed to direct sunlight or surface temperature in excess of 130°F may result in intercoat disbondment. Coating film exposed to an accumulation of over 24 hours of UV exposure before topcoating will result in intercoat disbondment. Special procedures (such as shading with tarps) should be used to prevent an accumulation of 24 hours of UV exposure. Overcoating shall be performed as soon as possible to prevent contamination. Any moisture from condensation or any source will kill the cure on freshly applied coating before it reaches a "non-tacky" stage.

B. STEEL SURFACE

1. All steel surfaces shall receive two coats of Plasite No. 4300 or Flakeline 232. The final dry film thickness shall be 35 to 45 mils.

C. HORIZONTAL SURFACES

1. Floor topping shall be installed in those areas indicated on the drawings and in strict accordance with this specification and manufacturer's current technical bulletin. The following application instructions refer to Plasite 5602; equivalent procedures for Master Builders Poly Plus 163 system is acceptable.

2. Floor topping shall be installed at a nominal 3/8" thickness but shall not be less than 1/4". Floor topping is to be radiused up against vertical surfaces.

3. Topping must be applied in at least five (5) layers to a minimum thickness of 1/4" to 3/8". The primer aggregate coat shall be mixed as follows:

a. Mix one container Part A, B an C per mixing instructions. Pour the entire resin mixture onto the floor in a ribbon close to the starting edge or wall.

b. Using a squeegee (long handled 24" for large open areas, or small hand squeegee for small areas), spread the resin mixture back and forth across the floor working it away from the starting edge or wall. A roller may be used to do edges, walls or to remove lap marks from squeegee. Expected coverage is approximately 45 square feet per gallon. No puddling of coating will be allowed.

c. Immediately after the resin has been applied, broadcast aggregate (Part D) into resin layer at the rate of approximately 1/4 pound per square foot. Move to adjacent area and repeat the process until entire area to be overlayed has received primer aggregate coat.

d. Take care to ensure that no contamination of the surface occurs between coats from spillage, moisture or traffic.

4. First aggregate coat.

a. Mix resin and catalyst the same as primer aggregate coat. Using a squeegee, spread the resin mixture back and forth across the floor working it away from the starting edge or wall. A roller may be used to do edges, walls or to remove lap marks from squeegee. Coverage is approximately 45 square feet per gallon.

b. Immediately after resin has been applied, broadcast aggregate (Part D) heavily into resin layer at a rate of approximately 1 pound per square foot leaving no trace of wet or shiny spots. Leave wet edge for the next batch to connect to. Do not allow resin mixture to harden before broadcasting aggregate (resin may begin to harden in 5 minutes). Move to an adjacent area and repeat this process (connecting to the wet edge of the previous batch) until entire area to be overlayed has received first aggregate coat.

c. When floor can be swept without disturbing aggregate imbedded in resin (generally 1 hour at 70°F floor temperature), sweep up excess aggregate. Keep swept aggregate clean and dry for re-use. Take care to ensure that no contamination of the surface occurs

between aggregate coats from spillage, moisture or traffic.

5. Second aggregate coat.

   Repeat procedure as with first coat.

6. Third aggregate coat.

   Repeat procedure as with second aggregate coat.

7. Final coat.

   Determine degree of non-skid desired. The final coat thickness determines the degree of non-skid for the finished floor. A roller applied final coat will provide a very pronounced non-skid, while a squeegee applied final coat will result in a moderate non-skid. The degree to non-skid may be further lessened by adding coat(s) of resin mixture. Test in an "out of the way" area determine customer acceptance prior to proceeding "full scale". When determining the degree of non-skid for the finished floor, keep in mind that too smooth can be slippery, and too rough can be difficult to clean (a coverage of 55 to 60 square feet per gallon will produce an adequate non-skid yet cleanable surface). Mix one container Parts A, B an C per mixing instructions. Apply the final coat resin mixture to the surface using either roller or squeegee at the required rate to obtain selected non-skid surface. The degree of non-skid can be lessened by adding additional coats.

D. COLLECTION SUMPS (non steel-lined)

1. All concrete surfaces (vertical and horizontal) of non steel-lined sumps shall be coated with Flakeline mat reinforced 232 vinyl ester system for maximum chemical protection under immersion service. Final thickness shall be a minimum 1/16".

3.04 JOINT CONSTRUCTION

Construction joints with saw cuts will be filled with a stress-relieving semi-rigid adhesive. Joints at horizontal and vertical intersections will be filled with a compatible grout to produce a radius prior to final coating.

3.05 POST-APPLICATION CONDITIONS

A. CURING

1. The minimum air dry time at 70°F surface temperature is 10 days. If force curing is incorporated, an air dry time with air movement of a minimum 2 hours shall be allowed. Temperatures should then be raised approximately 30°F in increments of 30 minutes to final surface temperature. Curing schedule as outlined in the Plastic Technical Bulletin for the respective coatings can be incorporated.

   NOTE: The final cure requirement can be accumulative. Final cure requirements must be met within 14 days of application.

2. Compare hardness with cured test panels with knife point or any physical test.

3. Surface temperature shall be recorded a least every 4 hours and before application of coating. Humidity (wet bulb reading) shall be taken at same time as metal temperature reading to ensure that surface temperature is at least 5°F higher than wet bulb temperature. Dry bulb temperatures shall be recorded at the same time to ensure curing. Metal temperature is the governing factor.

B. TESTING

1. Dry film thickness shall be determined utilizing a non-destructive type high range gauge. The anticipated film thickness shall be in the middle range of the gauge. The dry film thickness of the vertical surface protective coating shall be a nominal 40 mils with acceptable minimum at 35 and maximums at 45 mils. The dry film thickness for the horizontal floor topping shall be a nominal 3/8" thickness and not less than 1/4" thickness.

2. For the Plasite 4300 or Flakeline 232 protective coating, the total dry film thickness shall be a minimum of 35 mils, with a maximum of 45 mils, and acceptable spot readings at 50 mils. A suspect area, that being in excess of 45 mils, shall then be acceptable if an average of 35 to 45 mils is obtained when four additional readings are observed, taken approximately one foot from the suspect area at top, bottom, and both sides. For the Plasite 5602 or Poly Plus 163 floor topping the minimum thickness shall be 1/4".

3. For steel coatings, a pinhole-free film is essential and testing with TINKER & RASOR Model AP-W or equivalent is required on final film. Voltage for testing the coatings shall be as recommended by the manufacturer. Allow a minimum cure of 48 hours at 70°F for 36 hours at 90°F before testing.

4. Repair of damaged areas shall be as follows:

   a. Clean damaged area, removing all contaminants and loose coating.

   b. Abrasive blast substrate to original specification where coating has been exposed to environment and where oxidation is evident. Feather the original coating not less than 2 inches from damaged area.

   c. If new coating is physically damaged and has not been in service, repair as shown above. For repairing holidays, sand surface and brush apply proper thickness of coating.

   d. Apply coating by brush or spray. Do not apply by brush on areas larger than 1 square foot. WARNING! Contamination of previously exposed coating film may be detrimental to adhesion of the repair and may affect service life expectancy.

   e. Refer to Section 3.05A for Curing.

END OF SECTION

DIVISION 10 - SPECIALTIES

SECTION 10160 - METAL TOILET COMPARTMENTS

1. GENERAL

1.01 SCOPE

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to work specified in this Section.

B. Work by this Section includes but is not limited to:
1. Metal toilet compartments, ceiling hung.
B. Urinal screens: wall mounted.

1.02 RELATED SECTIONS

A. Section 05120 - Structural Steel and Steel Joists: Above ceiling framing for partition panel support.

B. Section 10800 - Toilet and Bath Accessories.

1.03 REFERENCES

A. ANSI A117.1 - Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.

B. ANSI/ASTM A424 - Steel Sheets for Porcelain Enameling.

C. ANSI/ASTM A526 - Steel Sheet, Zinc-Coated (Galvanized) by the Hop-Dip Process, Commercial Quality.

D. ASTM A167 - Stainless and Heat Resisting Chromium-Nickel Steel Plate, Sheet and Strip.

E. FS RR-P-1352 - Partitions, Toilet, Complete.

1.04 SUBMITTALS

A. Submit shop drawings and product data under provisions of Section 01300.

B. Indicate on shop drawings, partition plan and elevation views, dimensions, details of wall and ceiling supports, and door swings.

C. Provide product data on panel construction, hardware, and accessories and manufacturer's full color selection.

2. PRODUCTS

2.01 MATERIALS

A. Sheet Steel: ANSI/ASTM A526, with G90 zinc coating.

B. Attachments, Screws, and Bolts: Stainless steel; tamper proof type; heavy duty extruded aluminum brackets.

C. Hardware: Chrome plated non-ferrous cast pivot hinges, gravity type, adjustable for door close positioning; nylon bearings; thumb turn door latch; door strike and keeper with rubber bumper; cast alloy chrome plated coat hook and bumper.

2.02 FABRICATION

A. Fabricate partitions in accordance with FS RR-P-1352.

B. Fabricate components of steel sheet as follows:
1. Panels: 20 gauge and Door Faces: 20 gauge.
2. Pilaster Faces: 16 gauge.
3. Reinforcement: 12 gauge.

C. Doors and Panels: 1" thick x length x 57" high, sheet steel face, pressure bonded to sound deadening core; 36" wide door.

D. Pilasters: 1-1/4 inch thick, constructed same as doors, of sizes required to suit cubicle width and spacing.

E. Pilaster Shoes: Formed ASTM A167 Type 304 stainless steel with No. 4 finish.

F. Doors, Panels and Pilasters: Form and close edges, miter and weld corners, grind smooth.

G. Urinal Screens: One inch thick x 18 inches wide x 42 inches high with full height flange mounting on each side.

H. Internal Reinforcement: Provide in areas of attached hardware and fittings. Mark locations of reinforcement for partition mounted washroom accessories.

2.04 FACTORY FINISHING

A. Clean, degrease, and neutralize panels.

B. Follow with a phosphatizing treatment, prime coat and two finish coats baked enamel, color white. Urinal screens finish shall be porcelain ground coat with finish color coat conforming to Porcelain Enamel Institute specifications, white.

3. EXECUTION

3.01 EXAMINATION

A. Verify that site conditions are ready to receive work and opening dimensions are as indicated on shop drawings.

B. Verify correct spacing of plumbing fixtures.

C. Verify correct location of built-in framing, anchorage, and bracing, where required.

D. Beginning of installation means acceptance of existing surfaces.

3.02 INSTALLATION

A. Install partitions secure, plumb and level in accordance with manufacturers' instructions.

B. Maintain 3/8 to 1/2 inch space between wall and panels and between wall and end pilasters.

C. Attach panel brackets securely to walls using anchor devices.

D. Attach panels and pilasters to bracket with through sleeve tamperproof bolts and nuts.

E. Anchor urinal screen panels to walls with continuous flange brackets each side.

F. Support pilasters from built-in framing using two adjustable hanging studs providing vertical leveling. Conceal ceiling fastenings with pilaster shoe.

G. Equip each door with two hinges, one door latch, and one coat hook and bumper.

H. Install door strike and keeper with door bumper on each pilaster in alignment with door latch.

I. Adjust hinges to locate doors in partial opening position when unlatched.

3.03 ADJUSTING

A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.

3.04 CLEANING

A. Remove protective maskings. Clean surface.

B. Field touch-up of scratches or damaged enamel finish will not be permitted.

C. Replace damaged or scratched materials and with new materials.

END OF SECTION

SECTION 10 - SPECIALITIES

SECTION 10800 - TOILET AND BATH ACCESSORIES

1. GENERAL

1.01 SCOPE

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to work specified in this Section.

B. Work by this Section include but is not limited to:
   1. Toilet and washroom accessories.
   2. Attachment hardware.

1.02 REFERENCES

A. ANSI A117.1 - Specifications for Making Buildings and Facilities Accessible To and Usable by Physically Handicapped People.

B. ANSI/ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars and Strips.

C. ANSI/ASTM A366 - Steel, Carbon Cold-Rolled Sheet, Commercial Quality.

D. ANSI/ASTM A386 - Zinc Coating (Hot-Dip) on Assembled Steel Products.

E. ANSI/ASTM B456 - Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.

F. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.

G. ASTM A269 - Seamless and Welded Austenitic Stainless Steel Tubing for General Service.

1.03 SUBMITTALS

A. Submit product data in accordance with Section 01300, Submittals.

B. Provide product data on accessories describing size, finish, details of function, attachment methods.

C. Submit manufacturer's installation instructions.

1.04 REGULATORY REQUIREMENTS

A. Conform to applicable code for installing work in conformance with ANSI A117.1.

1.05 SEQUENCING AND SCHEDULING

A. Coordinate the work of this Section with the placement of internal wall reinforcement.

2. PRODUCTS

2.01 MANUFACTURERS

A. Bobric (Model numbers scheduled are Bobric)

B. Bradley

C. Parker

2.02 MATERIALS

A. Sheet Steel: ANSI/ASTM A366.

B. Stainless Steel Sheet: ASTM A167, Type 304.

C. Tubing: ASTM A269, stainless steel.

D. Fasteners, Screws, and Bolts: Stainless steel tamperproof.

2.03 FABRICATION

A. Weld and grind smooth joints of fabricated components.

B. Form exposed surfaces from single sheet of stock, free of joints.

C. Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.

D. Back paint components where contact is made with building finishes to prevent electrolysis.

E. Shop assemble components and package complete with anchors and fittings.

F. Provide steel anchor plates, adapters, and anchor components for installation.

G. Hot dip galvanize exposed and painted ferrous metal and fastening devices.

2.04 FACTORY FINISHING

A. Stainless Steel: No. 4 satin luster.

3. EXECUTION

3.01 EXAMINATION

A. Verify that site conditions are ready to receive work and dimensions are as indicated on shop drawings.

B. Beginning of installation means acceptance of existing conditions.

3.02 PREPARATION

A. Deliver inserts and rough-in frames to site at appropriate time for building-up.

B. Provide templates and rough-in measurements as required.

C. Verify exact location of accessories for installation.

3.03 INSTALLATION

A. Install fixtures, accessories and items in accordance with manufacturer's instructions.

B. Install plumb and level, securely and rigidly anchored to substrate.

C. Install toilet paper dispensers, paper towel dispensers, sanitary napkin dispensers, soap dispensers, and toilet seat cover dispensers furnished by the Owner.

3.04 SCHEDULE OF ACCESSORIES

A. Satin Finish Stainless Steel Tilted Mirror with Shelf: Frame constructed of Type 304, 22 ga. stainless steel. One-piece formed construction with no open miters. Unit to project 4" from wall at top and 1" at bottom. 5" x 16" shelf to be constructed of 22 ga. stainless steel and attached to frame by concealed mounting brackets. Mirror to be No. 1 quality 1/4" plate glass mirror electrolytically copper plated.

B. Custodial Mop Holder and Shelf: Boberic B-239, 54" long with 5 spring loaded rubber mop holders and hooks.

C. Grab Bars: 18 gauge, Type 304 stainless steel, 1-1/4" diameter peened grip with polished ends, concealed mounting with 3" diameter cover flange secured with set screws. Mounting plate to be 13 gauge 304 stainless steel. Provide wall reinforcement and vandal resistant stainless steel fasteners. Provide 2 mounting flanges for 24" bars and 3 flanges for 42" bars. Provide 30" swing away bars to meet requirements of the State of Connecticut, Office of Protection and Advocacy for the Handicapped. Product by T.S.M. of Los Angeles or equal.

3.05 LOCATION SCHEDULE

Women 10	-	1 mirror
	-	1 complete set of grab bars
	-	*2 Toilet Paper Dispensers
	-	*1 Paper Towel Denpenser
	-	*1 Soap Dispenser
Janitor 11	-	1 Mop Holder and Shelf
Men 12	-	1 Mirror
		1 Complete Set Grab Bars
		*1 Toilet Paper Dispenser
		*1 Paper Towel Dispenser
		*1 Soap Dispenser

*NOTE: Provided by Owner; installed by Contractor.

DIVISION 11 - EQUIPMENT

SECTION 11161 - DOCK LEVELERS

1. GENERAL

1.01 SCOPE

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to work specified in this Section.

B. Work by this Section include but is not limited to:
1. Prefabricated steel framed leveler.
2. Anchor bolts and plates for concrete pits.
3. Operating controls and hardware.
4. Dock Bumpers and anchor plates.

1.02 RELATED WORK

A. Section 03300 - Cast-In-Place Concrete

B. Section 05500 - Metal Fabrications

C. Division 16000 - Electrical Work: Power.

1.03 SYSTEM DESCRIPTION

A. Hydraulic operated dock leveler to following requirements:
1. Explosion proof Class 1, Division 1, Group D motor and controls for levelers @ doors 10 & 11.
2. Deck Size: 78 x 96 inches.
3. Rollover/Crossover Capacity: 50,000 lbs.
4. Travel: 12 inches above dock level, and 12 inches below dock level.

1.04 SUBMITTALS

A. Submit shop drawings and product data under provisions of Section 01300.

B. Indicate perimeter conditions of construction, materials and finish, installation details, roughing-in measurements, and operation of unit.

C. Submit manufacturer's installation instructions under provisions of Section 01300.

2. PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS: Rite . Hite Dock Safety System, Series Model HD20865 specified as the minimum standard acceptable. Provide LDG dock lock.

A. Substitutions: No Substitutions.

2.02 EQUIPMENT

A. Pit Frame: Steel Angle, 3 x 3 x 1/4 inch welded corners with concrete anchors. See Structural Drawings.

B. Leveler: Hydraulic leveler shall be supplied completely assembled with platform, lip, and electrical power pack assembly including motor, pump and valve assembly. Unit to have complete hydraulic control of all functions. Platform and lip to be operated by independent hydraulic cylinders controlled by remote push button station. Lip shall be powered in and out to reduce maintenance and prevent freight damage. Lip shall have independent "Extend" button allowing for lip extension at any point in the operating cycle to reduce cycle time. A red "Emergency Stop" button shall be a part of the control station allowing the attendant to stop leveler whenever necessary. All motion of lip and platform shall stop immediately when button is depressed. Stop button shall be maintained contact mushroom type button which will remain depressed and hold leveler in position without attendant holding button. Pulling out button will release "stop" mechanism allowing leveler to operate. A below dock level control selector switch shall be standard to allow for below dock end loading with all control of this function at the push button. A hydraulic safety stop shall arrest platform within 2" of free fall if truck accidentally pulls away while a load is on leveler. Provide "nite-lock" to prevent unauthorized entry. Levelers to have minimum 1/4" thick safety tread deck plate and minimum 1/2" x 16" high tensile 65,000 PSI lip section. Units to be furnished with a control station consisting of selector switch, lip extend, emergency stop, raise, and reset button. In conformance with ANSI MH 14.1 Standards.

C. Optional Equipment to be Provided:
1. Motor and Controls: Explosion proof, Class 1, Division 1, Group D @ doors 10 & 11. Non-explosion proof at others.
2. Dok-Lok Vehicle Restraint Safety System complete LDL-500 with audible alarm & lights - explosion proof @ doors 10 & 11. Non-explosion proof at others.

3. Hydraulic safety velocity fuse - limit full 3"
4. 2 - 4" thick tire fabric bumpers with mounting angles.
5. Weatherseal
6. 20" Lip
7. Abrasive Surface
8. Foam Insulated Deck

D. Hydraulic power pack shall be for 460 volts 3 phases. Motor to be 1 H.P. TEFC.

3. EXECUTION

3.01 PREPARATION

A. Provide pit frame, and anchors, rough-in sizes, and templates for building into Work. Miter pit frame angles where they join curb angle for field welding.

3.02 INSTALLATION

A. Install in prepared pit in accordance with manufacturer's instructions.

B. Set square and level; anchor securely flush to dock; weld back of leveling dock to pit frame. Touch-up weld with primer.

C. Adjust installed unit for smooth and balanced operation.

END OF SECTION